



SMITHSONIAN MISCELLANEOUS COLLECTIONS.

145

MONOGRAPH

OF

AMERICAN CORBICULADÆ.

(RECENT AND FOSSIL.)

PREPARED FOR THE SMITHSONIAN INSTITUTION.

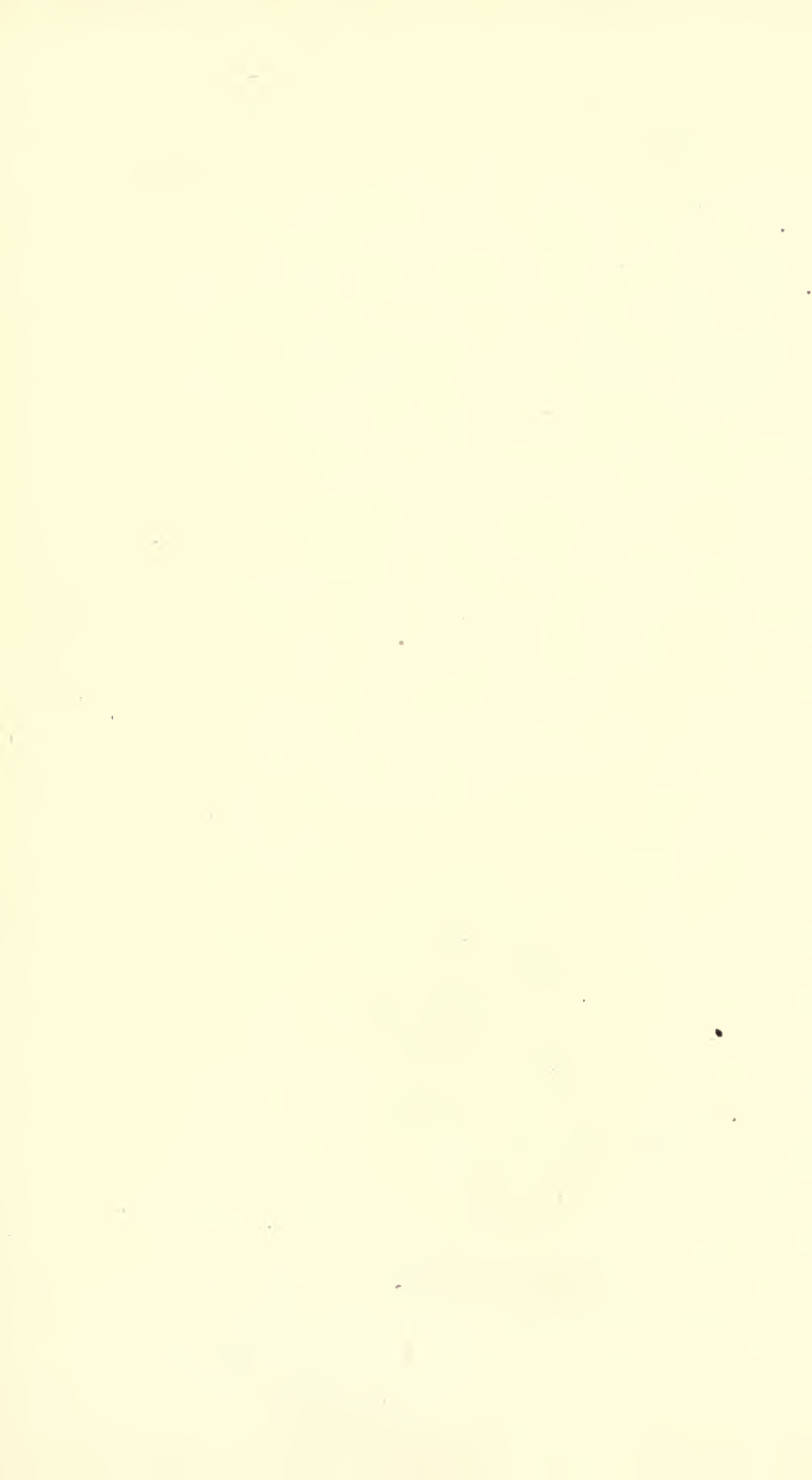
BY

TEMPLE PRIME.



WASHINGTON,
SMITHSONIAN INSTITUTION.

DECEMBER, 1865.



P R E F A C E.

IN the present MONOGRAPH OF AMERICAN CORBICULADÆ, prepared at the request of the Smithsonian Institution, it is proposed to show the present state of our knowledge of the species, both recent and fossil, which inhabit North and South America. It contains descriptions of all the genera of the family, whether represented on this continent or not, descriptions of the species found in North and South America, notices of their geographical range, references to the collections in which authentic types of many of the species are known to exist, and comparisons of the different species with others of the same genus, indigenous and foreign.

I have been able to identify to my entire satisfaction very nearly all the species described as from America, and the instances in which I have not been successful, are duly noted in the text accompanying the description of the species.

I am aware of the fact that some of the genera adopted in these pages, based chiefly upon characters drawn from the shell alone, ought not to be retained with their present limits; nevertheless our knowledge of the soft parts of the species of this family is still so very imperfect that no other course is open to me but to preserve for the present the genera as I find them, however defective they may actually be.

It will soon be necessary, in order to keep pace with other departments of natural history, to introduce some modifications in the limits of the genera of the *Corbiculadæ*, but no really satisfactory or permanent result will be attained until a careful examination of the soft parts shall have been made.

I am at present engaged upon a new arrangement of the genera of the *Corbiculadæ*, based upon characters drawn from the soft parts and from the shell, and in order to call attention to this

subject, and to have it examined into by those conversant with it, I give a general outline of some of the changes which I think, in the present state of our knowledge of this family, might be made with advantage.

In the first place I propose to separate the American recent species of the genus *Corbicula* from the species of this genus inhabiting other regions, for the reason that in the American species the palleal impression is terminated in a sinus, whereas in the foreign species it is simple. This is a character derived from the soft parts, though the knowledge of it is conveyed to us by an examination of the shell. The same distinctions exist between the American recent species of the genus *Cyrena* and the foreign species of that genus; it may, therefore, likewise be advisable to constitute a separate genus for the American recent species of *Cyrena*.

In connection with this subject I may mention that three fossil species of *Corbicula* from the Paris basin, which I have had under examination, the *Corbicula cuneiformis*, *antiqua* and *forbesii*, have the palleal impression terminated in a sinus as in the American species. It may be necessary to remove these species from the old genus *Corbicula* and place them in the genus proposed for the American recent species of *Corbicula*.

The genus *Sphaerium* would I think be benefited by being divided into four genera, as follows :—

1. Shell solid, striæ deep, beaks rounded; example, *Sph. sulcatum*; *Sph. solidum* of Europe.
2. Shell somewhat solid, striæ light, beaks rounded; example, *Sph. rhomboideum*; *Sph. corneum* of Europe.
3. Shell delicate and pellucid, striæ not perceptible, beaks calyculate; example, *Sph. partumeium*; *Sph. lacustre* of Europe.
4. Shell very small, delicate, transverse, striæ very light, beaks calyculate; example, *Sph. bahiense*; *Sph. africanum* of South Africa.

These last proposed genera are based upon characters drawn from the shell alone; an examination of the soft parts of the first three proposed subdivisions is however now being made by my friend, Mr. Edward S. Morse, of Gorham, Maine. With regard to the fourth proposed subdivision, which I am very confident ought to constitute a separate genus, I regret to be obliged to state, that as yet, all my efforts to obtain alcoholic specimens of any of the species have been unsuccessful. The shell of the species of this

group differs very materially from those of the first three, both in size and in shape. The species of this fourth group have hitherto been referred to the type species, the *Sph. bahiense*, or described as species of *Pisidium*; they are very widely and abundantly distributed through Central and South America and the West Indies, where they take the place of the species of the three first groups, none of which are found in those regions; one species inhabits South Africa. It is very desirable that the soft parts of the species of this group should be submitted to examination, and I beg to recommend myself to the good offices of naturalists collecting in the southern portion of this continent.

I take this opportunity to acknowledge my indebtedness to our late Mr. Cuming, of London, for his unprecedented liberality in allowing all the specimens of *Corbiculadæ* of his cabinet to cross the ocean for my inspection, affording me thereby the only possible means of identifying many of the species described in Europe from this country. My thanks are also due to Monsieur. Deshayes, of Paris, for specimens of many of the species of *Corbiculadæ* from the Paris basin, by means of which I was enabled to compare the American species with the fossil ones of Europe. I am further under obligations to Mr. Hanley, of London, for having determined for me a species described by him from Central America; to Mr. Edward S. Morse for the able and faithful manner with which he has executed the drawings on wood inserted in the text of the monograph; to my correspondents abroad for the material which they have furnished me for instituting comparisons, and to my American correspondents for the assistance they have afforded me in determining the geographical range of the *Corbiculadæ* of America, by sending me specimens from all parts of the country.

It is scarcely necessary to add that I have had the full use of all the specimens of the Smithsonian Institution.

TEMPLE PRIME.

HUNTINGTON, L. I., N. Y.,
December, 1865.

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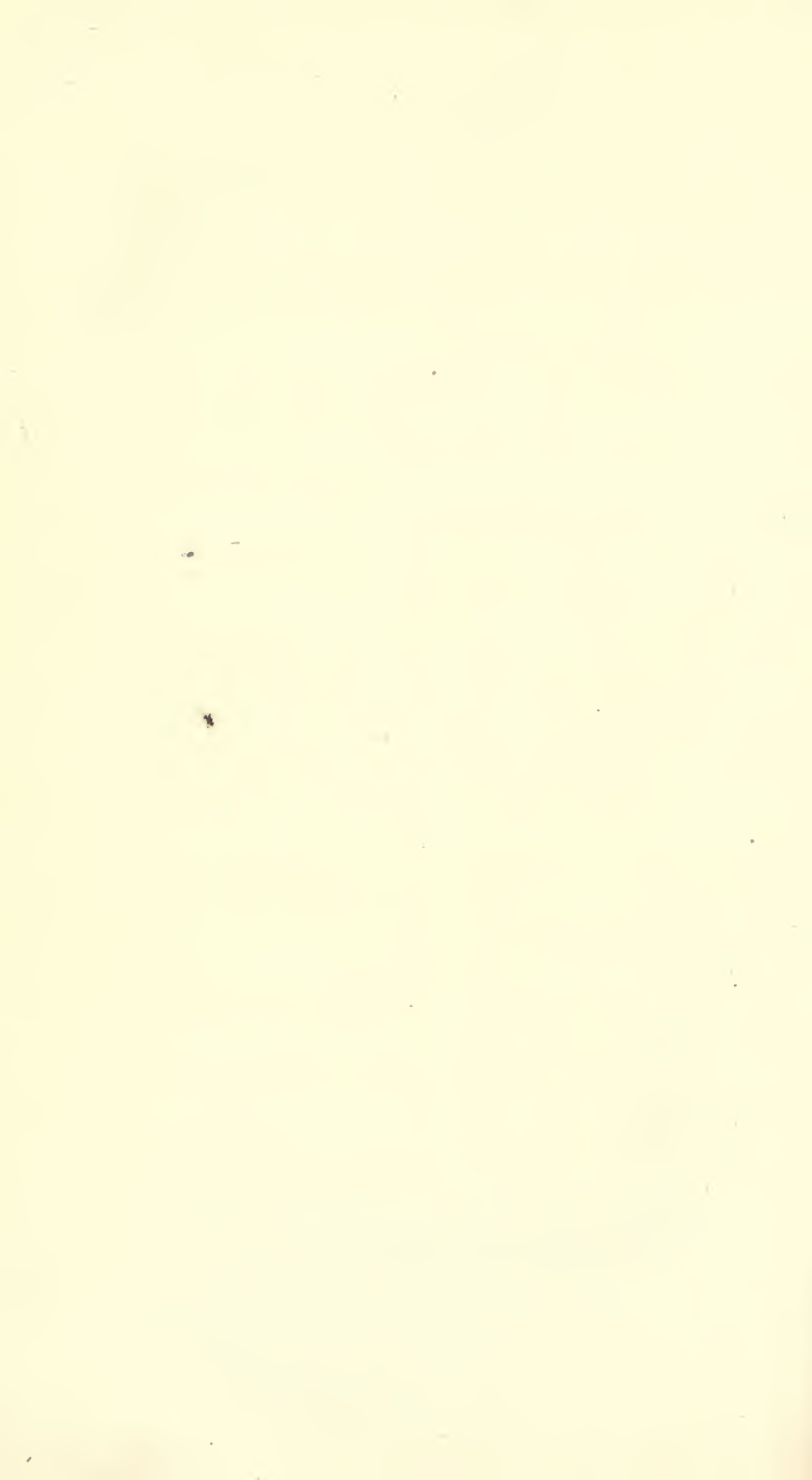
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MONOGRAPH

OF

AMERICAN CORBICULADÆ.

FAMILY CORBICULADÆ.¹

Les conques (ex parte), LAMARCK, 1809.—*Cycladæes*, RAFINESQUE, 1815.—*Les conques fluviatiles*, LAMARCK, 1818.—*Veneriadæ*, GRAY, 1818.—*Cycladia*, RAFINESQUE, 1818.—*Les Cyclades*, FERUSSAC, 1822.—*Cycladine*, LATREILLE, 1825.—*Cycladæ*, FLEMING, 1828.—*Cycladea*, DESHAYES, 1830.—*Cyrenidæ*, GRAY, 1840.—*Cycladacea*, HINDS, 1844.—*Cyclasidæ*, D'ORB., 1846.—*Corbiculadæ*, GRAY, 1847.

Animal regular, mantle with the lobes free in front and at the base, ending in two short syphons united at their base and sometimes to the extremity; foot triangular, compressed, tongue shaped or cylindrical; tentacles of the mouth small, triangular, pointed; gills broad, unequal, united behind.

Shell regular, oval or subtrigonal, covered with an epidermis; hinge with two or three teeth in each valve; lateral teeth two, simple or striated; pallial impression simple or with a short sinus; ligament external.

The Corbiculadæ are divided into the following six genera:—

A. Cardinal teeth 3, 3, anterior of right and posterior of left valve smallest. Shell solid.

1. *Corbicula*, MEGERLE, 1811.—Shell subcordate; lateral teeth compressed, subequal, finely striated.
2. *Batissa*, GRAY, 1852.—Shell subcordate; lateral teeth compressed, anterior very short, posterior elongate.
3. *Velorita*, GRAY, 1834.—Shell cordate, triangular, thick, teeth large, lateral very finely striated, anterior very large, regular, hinder elongate, compressed.
4. *Cyrena*, LAMARCK, 1818. Shell subcordate; lateral teeth smooth, front roundish, hinder rather compressed.

¹ Proc. Zool. Soc. XV, 1847, 184.

B. Cardinal teeth 2, 2, moderately diverging, front of right valve and hinder of left valve smaller; lateral teeth elongate, compressed, smooth; of right valve double, of left valve simple. Shell thin.

5. *Sphærium*, SCOPOLI, 1777.—Shell oblong, cordate, equilateral; syphon of animal separate, diverging at the tip.

6. *Pisidium*, PFEIFFER, 1821.—Shell ovate, wedge-shaped, inequilateral, truncated behind; syphons of animal short, united to the end.

CORBICULA, MEGERLE.¹

Tellina, MÜLLER, 1774.—*Venus*, CHEMN. 1782.—*Cyclas*, BRUG. 1792.—*Corbicula*, MEGERLE, 1811.—*Cyrena*, LAMK. 1818.—*Venulites*, SCHL. 1820.

Animal.—"Mantle, lobes free on the lower edge and in front, united behind; edge simple, with a series of short conical beards just within the margin; syphons two, very short, separate, contractile; apertures fringed with short crowded conical beards; foot compressed, subquadrate, rather produced in front; body swollen; abductor muscles large, anterior oblong, the hinder round, subtrigonal.

"Labial tentacles 2 pair, large, broad, trigonal, equal; gills oblong, inner pair large, the outer about half the depth of the inner."—GRAY, MSS.

Shell oval or trigonal, subequilateral, heart-shaped; three diverging cardinal teeth in each valve; two lateral teeth compressed, narrow, very finely striated; beaks generally broad and not much raised; muscular impressions small, round, or elliptical; pallear impression variable.

This genus was instituted by Megerle¹ for a certain group of fresh-water bivalves, placed by Müller among the *Tellina*, and represented by the *Tellina fluminalis*, *fluviatilis*, and *fluminea*.

The *Corbicula* differ from the *Cyrena* proper, in having the lateral teeth very much elongated, narrow, both of nearly the same size, and very finely striated. The species of this genus are trigonal, and are, with the exception of *Corbicula woodiana*, as compared to the *Cyrena*, always small. The animal is similar to that of *Cyrena*.

¹ Berliner Mag. V, 1811, 56.

This genus has of late years been very generally adopted by European conchologists. We do not find any living representative of this genus on the northern portion of this continent, the most northern extremity to which it extends being Mazatlan. As yet we know of no species from the West Indies, either living or fossil; in South America, on the contrary, they seem to exist in considerable abundance.

A peculiarity of the *Corbicula* found in America, which they share with our *Cyrena*, lies in the fact that the palléal impression always terminates in a sinus, whereas in the species from other regions it is simple.

1. *Corbicula convexa*, DESHAYES.—Shell orbicular, heart-shaped, inequilateral, solid; the anterior side the shorter; beaks tumid, rounded, opposite; lunula indistinct, ligament short, prominent; valves convex, the interior white; epidermis light-green; striæ irregular, delicate; three unequal cardinal teeth, the central bifid; lateral teeth nearly equal, narrow, delicately striated, palléal impression terminating in a small trigonal sinus.

Long. .72; Lat. .66; Diam. .50 inch.

" 18; " 16; " 13 mill.



C. convexa.

Hab. North America, at Mazatlan, in Mexico.
(Cabinets of Cuming and Prime.)

Corbicula convexa, DESHAYES, Proc. Zool. Soc. XXII, 1854, 342.

Corbicula ventricosa, PRIME in litt.

I have never seen the original *C. convexa*, but have very little doubt from the description Mr. Deshayes gives of that species, that the shell in my cabinet, which I called *C. ventricosa*, is identical with it.

This species is easily distinguished by its globular shape, which renders it very different from all others; externally it is somewhat similar to the young of *Cyrena mexicana*.

2. *Corbicula paranensis*, DESHAYES.—Shell small, rounded-oval, somewhat inflated, inequilateral; anterior side short, rounded, posterior side somewhat abrupt; beaks small, inclined towards the anterior; valves full, strong, interior white; striæ very light, hardly visible; epidermis light-green; hinge-margin rounded, thick; three cardinal teeth, unequal, divergent; lateral teeth nearly equal, the anterior one a little arched, finely striated; palléal impression terminating in a small sinus.

Fig. 2.



C. paranensis.

Long. .4; Lat. .34; Diam. .25 inch.

" 10; " 8; " 6 mill.

- *Hab.* South America, in the Parana River. (Cabinets of the British Museum, Smithsonian Institution, and Prime.)

Cyrena paranacensis, D'ORB. Mag. de Zool. V, 1835, 44.

Cyclas paranensis, D'ORB. Voy. Amer. 1846, 567, pl. 83, f. 23—25.

Corbicula paranensis, DESHAYES, Brit. Mus. Bivalves, 1854, 231.

This small rounded species is somewhat similar in outline to some inflated species of *Sphærium*. It is remarkably robust for its size, and I know of no species of the same genus to which it has any very near affinity. Compared with *C. convexa*, it is very much smaller, less inflated, and proportionately more solid.

3. *Corbicula obsoleta*, DESHAYES.—Shell oval, trigonal, oblique,

Fig. 3.



C. obsoleta.

inflated, inequilateral, proportionately solid; anterior side broad, short, obtuse; posterior side subangular; beaks prominent, oblique; valves rather heavy; interior bright violet; epidermis olive-green, varying in shade in places; striæ heavy and irregular; hinge-margin narrow, three cardinal teeth, small, nearly parallel to each other; lateral teeth narrow, equal, the anterior tooth a little curved.

Long. .70; Lat. .65 inch.

" 18; " 16 mill.

- Hab.* South America, in Uruguay. (Cabinet of Cuming.)

Corbicula obsoleta, DESHAYES, Proc. Zool. XXII, 1854, 345.—II.

Conch. IX, 1861, pl. 2, f. 4.

In outline this species offers some similarity with *C. rotunda*, it is however larger and more solid. Compared with *C. convexa* it is more oblique and less inflated.

The only specimen I have seen of this species is the one in the collection of Mr. Cuming, which he kindly lent me for examination.

4. *Corbicula rotunda*, PRIME.—Shell rounded-oval, somewhat trigonal, moderately inflated, nearly equilateral; anterior side a little the narrower, sloping from the beaks, rounded, posterior side shorter, somewhat abrupt; beaks small, raised, inclined towards the anterior; valves rather higher than they are broad; striæ coarse; hinge thick, three unequal cardinal teeth; lateral teeth nearly equal, finely striated, the anterior curved.

Long. .37; Lat. .37; Diam. .25 inch.

" 10; " 10; " 7 mill.

Hab. South America, in the Surinam River, Guyana. (Cabinets of the Academy of Natural Sciences of Philadelphia and Prime.)

Corbicula rotunda, PRIME, Pr. Acad. Nat. Sc. Ph. 1860, 80.

The only specimens I have seen of this species, those in Philadelphia and those in my own collection, are so worn that it is not possible to form any correct idea of the color of the epidermis, nor of the interior markings. Compared with *C. paranensis* it is more trigonal, longer from the beaks to the basal margin, transversely less broad and more inflated. It differs from *C. convexa* in being smaller, less rounded, higher and less inflated.

5. *Corbicula limosa*, DESHAYES.—Shell transverse, ovate-elliptical, inequilateral, compressed, somewhat tumid, comparatively solid, anterior side narrower, posterior shorter, subtruncated; striæ irregular; epidermis greenish; valves rather strong, inside white or of a deep violet; beaks tumid, inclined towards the interior; hinge-margin broad, with three unequal teeth; cardinal teeth diverging, the principal ones bifurcated; lateral teeth nearly equal in length, narrow, serrulated; pallæal impression terminating posteriorly in a small trigonal sinus.

Long. .87; Lat. .68; Diam. .50 inch.

" 22; " 18; " 13 mill.

Hab. South America, in the rivers of Eastern Uruguay. (Cabinets of the British Museum, Smithsonian Institution, Cuming and Prime.)

Tellina limosa, MATON, Trans. Linn. Soc. London, X, 1809, 325, pl. 24, f. 8-10.

Cyrena limosa, GRAY, Ann. Ph. n. ser., IX, 1825, 137.

Cyrena variegata, D'ORBIGNY, Guer. Mag. V, 1835, 44.

Cyclas variegata, D'ORBIGNY, Voy. Amer., 1846, 567, pl. 82, f. 14-16.

Cyclas limosa, D'ORBIGNY (error), loc. sub. cit. 1846, pl. 82, f. 14-16.

Corbicula semisulcata, DESHAYES, Proc. Zool. XXII, 1854, 343.

Corbicula limosa, DESHAYES, Biv. Brit. Mus. 1854, 231.

Fig. 4.



C. limosa.

This well-marked species varies much in general appearance; some specimens are beautifully marked with light brown rays running from the beaks towards the basal margin, others do not exhibit these markings. The epidermis of the young shell is very

smooth, at times glossy. The interior of the valves is either white or deep violet. Found not unfrequently.

I have never seen an original specimen of the *Tellina limosa*, but have no doubt, from an examination of the description given of it and of its figure, that it is the *Cyrena variegata*, D'Orb. With regard to the *Corbicula semisulcata*, Desh., with the habitat New Holland, of which I have received authentic specimens from Mr. Cuming, I can find no difference between it and the species under examination. I am convinced that the habitat assigned to the *Corb. semisulcata* is incorrect, from the fact that it has a sinus, a peculiarity confined to the *Corbiculadæ* of this continent.

This species is distinct from all other American ones of the genus in its elliptical and compressed shape.

6. *Corbicula cuneata*, DESHAYES.—Shell trigonal, very inequilateral, cuneiform, anterior side short, sloping, rounded ;

Fig. 5.



C. cuneata.

posterior side longer, subangular, inferior margin slightly rounded ; beaks tumid, opposite, inclined towards the anterior, often eroded ; valves solid, interior orange, pink or violet ; striæ regular though deep ; epidermis dark blackish or brownish-green, glossy ; hinge-margin thick, three strong cardinal teeth ; lateral teeth lightly striated, anterior curved, a little the shorter ; palléal impression terminating in a small narrow sinus.

Long. .78 ; Lat. .68 ; Diam. .50 inch.

" 20 ; " 17 ; " 13 mill.

Hab. South America, in the Orinoco River. (Cabinets of Jonas, Cuming, Smithsonian Institution, Jay and Prime.)

Cyrena cuneata, JONAS, Zeit. Malak. 1844, 186.—Phil. Abb. II, 1846, 77, pl. 1, f. 6.

Cyrena globulus, JONAS, in litter.

Corbicula incrassata, DESHAYES, Proc. Zool. XXII, 1854, 342.

Corbicula cuneata, DESHAYES, Biv. Brit. Mus. 1854, 231.

This is a remarkably well characterized species not likely to be confounded with any other, the outline recalling somewhat that of the *Cyrena antiqua* of the Basin of Paris. I know of no recent species to which it is at all allied.

I have not seen any original specimen of the *Cyrena cuneata*, Jonas, but judging from the description and figure given of it in Philippi, I have no doubt that the specimens from which this de-

scription was prepared, authentic *Corb. incrassata*, Desh., obtained from Mr. Cuming, from whose collection Mr. Deshayes described this species, are identical with it.

7. *Corbicula brasiliiana*, DESHAYES.—C. testa trigona, subtransversa, tumidula, inæquilaterali, tenuè et regulariter transversim striata, epidermide viridi nitente vestita; umbonibus minimis, prominulis, oppositis; latere antico paulo breviori, supernè rectilineo, declivi, postico parumper attenuato, rotundato; cardine angusto tridentato, altero bidentato, dentibus minimis divergentibus, lateralibus elongatis, angustis, sub lente exilime striatis; sinu pallii parvulo triangulari, apice acutissimo.

Hab. South America, at Para, in Brazil. (Cabinet of the British Museum.)

Corbicula brasiliiana, DESHAYES, Biv. Brit. Mus. 1854, 232.

I have not seen any specimens of this species.

FOSSIL SPECIES.

8. *Corbicula truncata*, PRIME.—C. testa cordata, inæquilatera, oblique truncata; sulcis transversis, latere antico angulato.

Long. .25 mill.

Hab. North America; (in the State of New York?). (Cabinets of the Garden of Plants in Paris and of Valenciennes.)

Cyrena truncata LAMARCK, Anim. s. vert. V, 1818, 553.

I have never seen this species, which I am inclined to believe does not come from New York, but more probably from some of the Southern States. Mr. Deshayes says in the Encyclopédie Méthodique, that it bears such a close resemblance to *Cyrena cuneiformis*, that some of the valves of the two species actually fitted into each other.

9. *Corbicula moreauensis*, MEEK and HAYDEN.—"Shell ovate, nearly elliptical, compressed, extremities rounded; anterior end narrower than the posterior, base semi-ovate, most prominent behind the middle; beaks not much elevated, placed a little in advance of the centre; surface marked with fine distinct lines of growth; cardinal edge rather thick, and having under the beaks three diverging central teeth in each valve, the anterior of which is the smallest; lateral teeth two (in the left valve) long, parallel to the cardinal edge, and fitting into corresponding grooves in the other valve; muscular impressions deep."

Long. 0.90; Lat. 0.66; Diam. 0.36 inch.

Hab. North America, near Moreau River, Nebraska. Tertiary formation. (Cabinet of the Smithsonian Institution.)

Cyrena moreauensis, M. & H. Proc. Ac. N. S. Phil. 1856, 115.

Corbicula moreauensis, M. & H. Id. Oct. 1860, 432.

"Each of the cardinal teeth has, in its upper end, a small notch which is occupied, when the valves are closed, by a small projection between the teeth of the other valve. The anterior lateral tooth appears to be larger and approaches the central teeth more nearly than the posterior. Our specimens are generally more or less worn, and thickly coated with firmly adhering sand. Found in a sand-bed, near Moreau River, associated with bones of Titanotherium? Probably a distant outlier of the White River bone beds."—M. & H.

10. *Corbicula nebrascensis*, MEEK and HAYDEN.—"Shell oval-ovate, compressed, rather thin; extremities rounded; base semi-elliptical; beaks moderately elevated, not gibbous, placed nearly half way from the middle to the anterior end; surface marked with fine lines of growth, occasionally rising into obscure concentric wrinkles; edge of the cardinal border thin; cardinal teeth close under the beaks, posterior one very oblique."

Long. 0.76; Lat. 0.68; Diam. 0.22 inch.

Hab. North America, near Moreau River, Nebraska. Tertiary formation. (Cabinet of Smithsonian Institution.)

Cyrena intermedia, M. & H. (preoc.), Proc. Ac. N. S. Phil. 1856, 116 (not *C. intermedia*, Melville, 1843).

Corbicula nebrascensis, M. & H. Proc. Acad. Oct. 1860, 432.

"This species approaches some varieties of *C. pisum*, but is more inequilateral, the posterior end being comparatively longer, the beaks are also less elevated. From the *C. moreauensis* it will be distinguished by its shorter and more rounded form, more elevated beaks, and much thinner cardinal edge."—M. & H.

11. *Corbicula occidentalis*, MEEK and HAYDEN.—"Shell subtriangular, very thick, rather ventricose; anterior end and base rounded, posterior end sloping abruptly from the beaks, and ventrically subtruncate at the extremity; beaks located a little in advance of the middle, and elevated, pointed, incurved and approximate; surface marked with strong lines of growth."

Long. 1; Lat. 1; Diam. 0.71 inch.

Hab. North America, at the Bad Lands of the Judith, Nebraska. Tertiary formation. (Cabinet of the Smithsonian Institution.)

Cyrena occidentalis, M. & H. Proc. Ac. N. S. Phil. 1856, 116.

Corbicula occidentalis, M. & H. Id. Oct. 1860, 432.

"Appears to be intermediate between *C. cordata* of Morris and *C. antiqua*, both of which are Eocene species. From the first it differs in being relatively higher; its posterior end is also shorter, and more distinctly subtruncate. From the latter it differs in being less elevated, not so concave in front of the beaks, nor so regularly arcuate on the posterior slope from the beaks to the base. In front it presents the same symmetrical cordate outline common to both these species."—M. & H.

12. Corbicula cytheriformis, MEEK and HAYDEN.—"Shell broad, trigonal, ovate, varying to subcircular, rather thick and strong; extremities more or less rounded, base semi-ovate, usually more prominent before than behind the middle; dorsal outline sloping from the beaks, the anterior slope being more abrupt than the other and slightly concave, while the posterior is convex; beaks rather elevated, moderately gibbous, located in advance of the middle; surface marked by fine lines of growth, which sometimes show a very slight tendency to gather into small irregular concentric wrinkles."

Hab. North America, near the mouth of the Judith River, Nebraska. Tertiary formation. (Cabinet of Smithsonian Institution.)

Corbicula cytheriformis, M. & H. Proc. Ac. N. S. Phil. 1861, 176.

BATISSA, GRAY.¹

Cyprina, *Cyclas*, BRUG. 1792.—*Cyrena*, LAMARCK, 1818.—*Venus*, GRAY.—*Batissa*, GRAY, 1852.

Animal oval, transverse; the lobes of the mantle simple or fringed, united posteriorly; two short syphonal tubes united at their base; foot compressed, oval, trigonal; mouth transverse, tentacles elongate, oval, trigonal, free; gills unequal, the inner ones larger, subquadrangular, outer ones subtrigonal.

Shell oval, rounded or subtrigonal, thick, solid, hinge broad, three unequal, divergent cardinal teeth in each valve, the posterior tooth longest and narrowest; lateral teeth unequal, double in the right valve, narrow elongated, striated, anterior tooth shorter; ligament large, prominent, thick subcylindrical; muscular impressions large, lunular or circular; pallear impression simple.

¹ Ann. Mag. Nat. Hist., n. ser., IX, 1852, 34.

The genus *Batissa* was established in 1852, by Mr. Gray, for a class of shells heretofore included under the genus *Cyrena*, and represented by the *Cyrena violacea*. The principal differences between the *Cyrena* proper and the *Batissa* are the following: the *Batissa* have compressed serrulated lateral teeth, the ligament is very large, rounded and prominent, the epidermis is dark and the paleal impression always simple. The hinge of the *Batissa* offers some analogy to that of the *Corbicula*, but is different in so far, that the anterior lateral tooth in *Batissa* is always short and much smaller than the posterior tooth.

The animal, according to Mr. Gray,¹ is similar to that of *Cyrena*.

The species of *Batissa*, very limited in number, are confined in their geographical distribution to the countries and islands of the Indian Ocean. I am not aware that as yet any have been found in a fossil state.

This new genus does not seem to have been received with much favor by conchologists, and more especially by those of the continent. Mr. Deshayes adopted it in 1854,² in describing some new shells from the Cuming Collection, but since then³ he has changed his views on the subject. I was the first to bring it into notice in this country.⁴

(This genus is not represented on this continent.)

VELORITA, GRAY.⁵

Cyrena, GRAY, 1825.—*Venus*, GRAY, 1828.—*Velorita*, GRAY, 1834.

Animal not observed.

Shell trigonal, higher than broad, heart-shaped, thick, inflated, posteriorly angular; hinge broad, thick, three unequal cardinal teeth, compressed, a little oblique, anterior tooth in the right valve very short, posterior tooth in the left valve obsolete; lateral teeth very unequal, anterior tooth thick, short, transverse, very close to the hinge, posterior tooth elongate, lightly striated, remote from the hinge; muscular impressions rounded, equal; pal-

¹ Bivalves of the Brit. Mus. 1854, 234.

² Proc. Zool. XXII, 1854, 13.

³ An. sans vert. bassin de Paris, I, 1860, 484.

⁴ Ann. N. Y. Lyceum, Nat. Hist. VII, 1860, 112.

⁵ Griffith's Cuvier, 1834, pl. 31, f. v.

leal impression ending in a very short sinus; ligament short, narrow.

This genus was established by Mr. Gray for a shell which he had previously described under the name of *Cyrena*; it differs very materially from the other genera of the family in its exterior shape and in the peculiar formation of the hinge. The valves are very thick, oblong, the beaks heart-shaped, and the lunula is very distinct and convex in the centre. The hinge is broad, it has three cardinal teeth, all inclined obliquely towards the posterior side, the anterior lateral tooth is very thick, prominent, and is placed very close to and at a right angle with the anterior cardinal tooth, the posterior lateral tooth is long, somewhat narrow, and to a certain extent similar to that of *Corbicula*.

We know of but one species of *Velorita*, a recent one from Japan, the *V. cyprinoides*.

Mr. Deshayes, who does not admit the validity of this genus, has discovered in the Basin of Paris certain forms of *Cyrena*, which would seem to establish a connecting link between *Velorita* and *Cyrena*.

(This genus is not represented on this continent.)

CYRENA, LAMARCK.¹

Venus, CHEMN. 1769.—*Cyclas*, BRUG. 1792.—*Cyrena*, LAM. 1818.—*Cyanocyclas*, FER. 1818.—*Polymesoda*, RAF. 1820.—*Mactra*, BRONGT. 1823.—*Geloina*, GRAY, 1844.

Animal oval, transverse; mantle lobes free on the lower edge and in front, united behind into two short syphons; foot large, compressed, ovate, trigonal; tentacles elongate, ovate, trigonal; gills unequal, the internal ones subquadrangular, the external ones smaller, subtrigonal.

Shell oval or subtrigonal, thick, solid; three cardinal teeth in each valve somewhat divergent; two lateral teeth, unequal, the anterior one situated nearer the cardinal teeth; pallear impression variable.

The genus *Cyrena*, as originally constituted by Lamarck, was

¹ Lamarck, Anim. s. vert., V, 1818, 551.

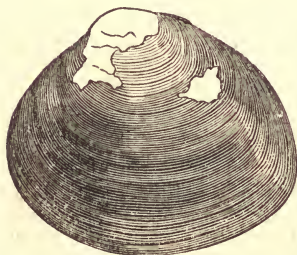
made to include several genera which have since been diverted from it—*Corbicula*, *Batissa* and *Velorita*. The genus, as now most generally received, embraces only the species of *Cyrena* with simple lateral teeth.

Cyrena in a living state are found in all tropical countries. The genus is represented at the present time in North America but by one species; in Central and in South America the species are numerous and bountifully distributed. I am not aware that, outside of America, any of the so-called Marine *Cyrena* have been found. A peculiarity of the *Cyrena* of this continent lies in the fact that the pallial impression is always terminated in a sinus, whereas in those from other parts of the world it is simple.

a. CYRENÆ proper.

- 1. *Cyrena caroliniensis*, LAMARCK.**—Shell orbicular-trigonal, inequilateral; margins generally rounded; beaks obtuse, oblique, often eroded; striæ very fine; epidermis rough, of a grayish olive-green; valves moderately full, not heavy; interior white in adult, pale bluish in young, occasionally with markings of light violet on the margins and on the hinge; hinge-margin narrow; cardinal teeth small; lateral teeth short, obtuse; sinus very narrow, acute at extremity.

Fig. 6.



C. caroliniensis.

Long. 1.44; Lat. 1.16; Diam. .94 inch.
 " 38; " 33; " 25 mill.

Hab. North America, in the States of Alabama and Georgia. (Cabinets of the British Museum, Smithsonian Institution, Cuming, Jay, Prime and others.)

Cyclas caroliniensis, Bosc, Fer. Cat. Méth. 1807.

Cyclas caroliniana, Bosc, III, 37, pl. xxiii, f. 4.

Cyrena caroliniensis, LAM. An. s. vert. V, 1818, 558.—SAY, pl. 52.

This, our most common species of *Cyrena*, is not very liable to be confounded with any other; in exterior it bears some resemblance to *C. mexicana*, it differs, however, in being larger, more trigonal, the beaks are less prominent and the sinus is narrower and more acute. The young shell is less elongated transversely and more quadrangular than the adult.

2. *Cyrena sordida*, HANLEY.—*C.* testa suborbiculari, crassa, subinaequilaterali, ventricosa aut tumida; epidermide olivaceo-fucescente et marginem ventralem convexum versus, luteo-virescente, concentrice rugulosa; margine dorsali postico, convexiusculo, declivi; natibus erosis, satis prominentibus; ligamento subinfosso; lunula nulla; superficie interne albida; dentibus lateralibus brevibus obtusis, antico magis approximato.

Long. 1.60; Lat. 1.50 inches.

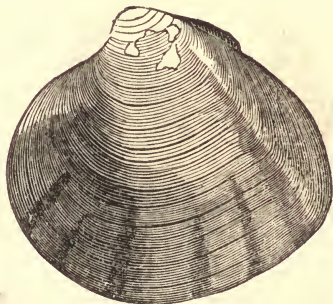
Hab. Central America. (Cabinet of Hanley.)

Cyrena sordida, HANLEY, Proc. Zool. XII, 1844, 159.—Index Test. Suppl. pl. xiv, f. 51.

I have not been able to identify this species. "The link between *C. caroliniensis* and *C. radiata*, uniting the interior and membranaceous wrinkles of the former to the general outline of the latter."—*Hanley*.

3. *Cyrena radiata*, HANLEY.—Shell rounded, somewhat oblique, heart-shaped, thick, solid, inequilateral, tumid, anterior side broad, rounded, posterior somewhat more extended, abrupt at extremity; beaks small, acute, approximate at apex, entire; striæ regular, epidermis light olive-green, shiny; interior of the valves violet; hinge-margin very much curved, thick; cardinal teeth unequal, divergent, the posterior teeth bifid at summit; lateral teeth unequal, the anterior tooth approximate, the posterior tooth elongated; sinus broad at mouth, acute at extremity, very short.

Fig. 7.



C. radiata.

Long. 1.40; Lat. 1.20, Diam. 1.00 inch.

" 42; " 39; " 28 mill.

Hab. In Central America, at Realejo, Nicaragua. (Cabinets of Hanley, the British Museum, Smithsonian Institution, Sowerby, Jay and Prime.)

Cyrena radiata, HANLEY, Proc. Zool. XII, 1844, 159.

The specimens from which this description was prepared were identified for me by the author himself. In some cases the epidermis of this species shows rays of a darker hue running from the beaks to the basal margin, this feature is, however, rather the exception than the rule. Compared with *C. arctata*, to which it

bears great resemblance in outline, it is very much less full, transversely broader, and the epidermis is not so dark; it is very closely allied to *C. solida*. Found not unfrequently.

4. *Cyrena solida*, PHILIPPI.—Shell rounded, somewhat oblique,

Fig. 8.



C. solida.

heart-shaped, thick, solid, inequilateral, very much inflated; anterior side rounded, posterior abrupt at extremity; beaks small, acute, curved inwards, approximate at apex, entire; striæ regular, coarse; epidermis dusky greenish-brown; interior of the valves violet; hinge-margin curved, thick, cardinal teeth divergent, unequal, anterior ones bifid; lateral teeth unequal, anterior conical approximate, posterior narrow, elongated; sinus broad at mouth, short, acute at extremity.

Long. 1.2 ; Lat. 1.09 ; Diam. 0.7 inches.

“ 34; “ 31; “ 23 mill.

Hab. Nicaragua and Balize. (Cabinets of Hanley, Smithsonian Institution and Prime.)

Cyrena solida, PHIL. Abbild. II, 1846, 78, pl. xv, f. 9.

This species is very closely allied to the *C. radiata*, with which it is often confounded, it is, however, smaller, more inflated, the striæ are not so regular, the epidermis is usually darker and without polish; some specimens exhibit on the epidermis the perpendicular rays common to *C. radiata* and *Corb. limosa*.

5. *Cyrena triangulara*, v. d. BUSCH.—Shell solid, obliquely subtriangular, subequilateral, somewhat ventricose; posterior dorsal slope angular, anterior less so, ventral margin arcuate; beaks nearly central, elevated; pointed, incurved, generally perfect; exterior calcareous, comparatively smooth, covered with a light ashy-green epidermis; interior of the valves variable, sometimes entirely violet, at others white with violet on the margins or flesh color on the muscular impressions; hinge-margin thick, three unequal and rather small cardinal teeth; anterior lateral tooth short, acute, posterior elongate, compressed; sinus narrow, elongated.

Long. 2.25 ; Lat. 2.25 inches.

“ 57; “ 57 mill.

Hab. North America, at Mazatlan, Mexico. (Cabinets of the British Museum, the State of New York, Cuming and Gould.)

Cyrena triangula, v. d. Busch, Philip. Abbild. III, 1849, 78, pl. 2, f. 3.

Cyrena altilis, GOULD, Bost. II. VI, 1852, 400, pl. xvi, f. 5, bis.

Cyrena varians, CARPENTER (pars), Mazatlan Shells, 1857, 115.

Cyrena mexicana, CARPENTER (pars), loc. sub. cit. 1857, 115.

Under the description of *C. mexicana* will be found a statement of my reasons for separating these two species, which have been confounded by Mr. Carpenter. The *C. altilis*, Gould, which I consider identical with this species, differs a little from v. d. Busch's original type of *C. triangula* as figured in Philippi, in being smaller, a little more swollen, and in having more prominent and more acute beaks; in the main, however, it is the same shell.

Compared with *C. radiata* it is less solid, larger, more triangular, the surface is smoother and the cardinal teeth are more delicate; it differs from *C. olivacea* in being more triangular, less elongated, more inflated, the epidermis is thinner and the cardinal teeth are more delicate.

Mr. Reigen seems to have found this species in abundance.

6. *Cyrena obscura*, PRIME.—Shell subtrigonal, heart-shaped, inflated, solid, tumid, subequilateral; anterior side rounded; posterior broader, rounded, subtruncated at extremity; beaks large, prominent, slightly eroded; valves heavy, full, interior white with markings of violet on the margins; striæ regular, deep; epidermis blackish-brown; hinge-margin curved, moderately broad; cardinal teeth unequal, divergent; lateral teeth elongated, narrow, anterior tooth nearer the cardinal teeth, larger, acute.

Long. 1.80; Lat. 1.70; Diam. 1.06 inches.

“ 48; “ 44; “ 33 mill.

Hab. South America. (Cabinet of Cuming.)

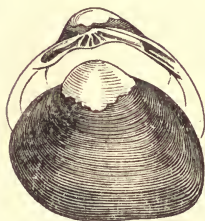
Cyrena obscura, PRIME, Proc. Zool. XXVIII, 1860, 321.

The only specimen I have seen of this species is the one in Mr. Cuming's collection. Compared with *C. insignis*, it is much less inflated and more equilateral; it is fuller and transversely less elongated than *C. olivacea*.

7. *Cyrena insignis*, DESHAYES.—Shell ovate-cordiform, thick, coarse, inequilateral; anterior side somewhat the shorter, broadly rounded; posterior side broad, truncate, obtusely angular; beaks large, tumid, somewhat oblique, opposite, eroded; striæ coarse, irregular more numerous on

the margins; epidermis dark brownish-green; hinge-margin curved; cardinal teeth strong, unequal, divergent; anterior lateral tooth large, broad, conical; posterior lateral tooth situated at a greater distance from the cardinal teeth, narrow, small; interior of the valves white or pale salmon color, with at times markings of violet on the margins; sinus very narrow, deep, ascending in a direction oblique to the beaks.

Fig. 9.

*C. insignis.*

Long. 1.75; Lat. 1.56; Diam. 1.43 inches.

" 45; " 40; " 36 mill.

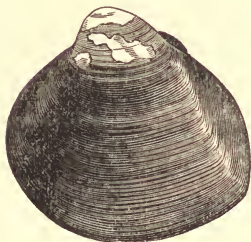
Hab. North America, in the State of California.
(Cabinets of Cuming and Prime.)

Cyrena insignis, DESH. Proc. Zool. XXII, 1854, 20.—Il. Conch. IX, 1861, 39, pl. 2, f. 2.

This species, which is quite rare, the only specimens known being the one in Mr. Cuming's collection and that in mine, does not present many points of similarity with any others.

S. *Cyrena arctata*, DESHAYES. — Shell trigonal, inflated, heart-shaped, heavy, inequilateral; anterior side short, somewhat angular; posterior side subtruncated; beaks large, oblique, generally eroded; striæ heavy, regular; epidermis blackish-green; interior of the valves white or pale rose-color with at times markings of pale violet on the muscular impressions; sinus short and broad; hinge-margin strong; cardinal teeth small, simple; lateral teeth subequal, prominent.

Fig. 10.

*C. arctata.*

Long. .86; Lat. .86; Diam. .68 inch.

" 35; " 35; " 28 mill.

Hab. South America, in Lake Maracaibo. (Cabinets of Cuming, Smithsonian Institution, Jay, Swift, Bland and Prime.)

Cyrena arctata, DESH. Proc. Zool. XXII, 1854, 20.

This species, though found in great abundance in the waters of Lake Maracaibo, has not to my knowledge been collected in other localities. Compared with *C. radiata*, to which it bears some resemblance in marginal outline, it differs in being somewhat smaller, very much more ventricose and more solid; the beaks are larger

and more full and the epidermis is darker and without any perpendicular radiations.

9. *Cyrena fortis*, PRIME.—Shell trigonal, tumid, solid, inequilateral; anterior side shorter, rounded; posterior side subtruncated; valves moderately full, interior dark violet; beaks large, inclined anteriorly, approximate at apex, slightly eroded; striae deep, regular, epidermis shiny, varying from green to brownish-green; hinge margin somewhat broad, curved; cardinal teeth unequal, divergent, simple; lateral teeth strong, anterior tooth nearer to the cardinal teeth, conical, posterior tooth, elongated; sinus deep, curved and acute at extremity.

Long. 2.38; Lat. 1.77;
Diam. 1.22 inches.

Long. 62; Lat. 47; Diam.
.32 mill.

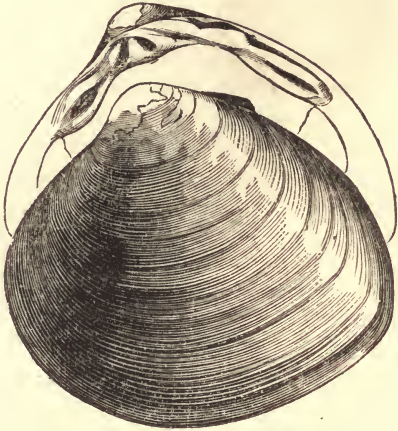
Hab. South America, in Ecuador. (Cabinets of Smithsonian Institution and Prime.)

Cyrena fortis, PRIME, ll. Conch. IX, 1861, 355—X, 1862, 387, pl. xiv, f. 2.

This fine and rare shell presents great similarity to *C. radiata*, it differs, however, in being larger, less equilateral, transversely longer, the beaks are a little fuller, the hinge is not so strong or so broad and the epidermis has more lustre; the perpendicular radiations common to some specimens of *C. radiata* are wanting.

10. *Cyrena olivacea*, CARPENTER.—Shell irregular, subtrigonal, somewhat compressed, subequilateral; anterior side shorter, rounded, posterior narrower, very angular; beaks large, prominent, inclined towards the anterior; valves very little convex, interior violet, darker on the margins; exterior surface irregular, striae coarse; epidermis rich olive-green; hinge-margin much curved, three unequal rather small cardinal teeth;

Fig. 11.



C. fortis.

anterior lateral tooth quite prominent, posterior shorter than usual; sinus very narrow, rather straight.

Fig. 12.

*C. olivacea.*

Long. 2.50; Lat. 2.06; Diam. 1.25 inches.

" 63; " 52; " 32 mill.

Hab. North America, at Mazatlan, in Mexico. (Cabinets of the British Museum, Smithsonian Institution, State of New York, Cuming and Prime.)

Cyrena fontaineii, PHILIPPI, Zeit. Malak. 1851, 70.—DESH. Brit. Mus. Cat. 1854, 253.

Cyrena olivacea, CARP. Mazatlan Shells, 1857, 114.

Philippi and Deshayes have both confounded this species with the *C. fontaineii* of D'Orbigny, which is a more regularly formed shell with very regular striae and with an even epidermis.

Mr. Carpenter, in speaking of the *C. olivacea*, says it is known outwardly by its flattened form, by its rich olive-green epidermis covering the umbos and rising into irregularly corrugated folds, which are very close on the anterior part. The interior displays a very dark purple over the greater part of the surface. The outline varies considerably. So far this species has not been found in any abundance.

11. *Cyrena regalis*, PRIME.—Shell small, subtrigonal, subequilateral, somewhat compressed, transversely short; anterior side rounded, posterior side forming a declivity from the beaks, somewhat produced, subabrupt at extremity; beaks nearly central, small, not much raised,

approximate at apex, eroded; striæ deep, very regular; valves solid, interior light violet; epidermis light olive-green; hinge-margin slightly curved, broad; cardinal teeth strong, unequal, divergent, the posterior ones bifid; lateral teeth unequal, depressed, posterior distant; sinus irregular in shape, long and tapering at extremity.

Long. 0.76; Lat. 0.73; Diam. 0.43 inches.

" 19; " 18; " 10 mill.

Hab. South America? (Cabinet of Prime.)

Fig. 13.



C. regalis.

A rare and pleasing species, the striæ are deep and very regular, which distinguish it from others; it is smaller, less inflated and transversely shorter than *C. solida*, the posterior margin is more produced at the extremity, the sinus is longer, the striæ are more regular and the epidermis is of a lighter color.

12. *Cyrena meridionalis*, PRIME.—Shell small, subquadrangular, compressed, subequilateral; anterior side semi-circular, a little produced; posterior side subabrupt; beaks small, inclined anteriorly, approximate at apex, eroded; striæ delicate, rather irregular; epidermis light brownish-green; valves solid, interior light violet; hinge-margin slightly curved; cardinal teeth strong, unequal, divergent, central tooth bifid; lateral teeth compressed, small, subequal; sinus narrow, curved at extremity.

Fig. 14.



C. meridionalis.

Long. 1.40; Lat. 1.32; Diam. 0.92 inches.

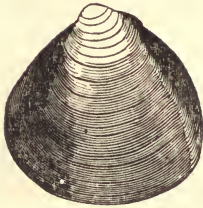
" 35; " 33; " 23 mill.

Hab. South America, at Payta, in Peru. (Cabinet of Prime.)

The external appearance of this species brings it near *C. ordinaria*; it is, however, much more transverse, and the hinge-margin is broader and less curved. A rare species.

13. *Cyrena ordinaria*, PRIME.—Shell small, trigonal, transversely very short, compressed, subequilateral; anterior side semi-circular; posterior side rounded from the beaks downwards, subabrupt at extremity; beaks prominent, small, inclined anteriorly, approximate, eroded; striæ fine, irregular, epidermis light brownish-green; valves solid, interior light violet; hinge-margin curved, broad; cardinal teeth unequal, divergent,

Fig. 15.

*C. ordinaria.*

anterior tooth in the right valve rudimentary, central slightly bifid; lateral teeth compressed, the cavity of the anterior tooth in the right valve united to the cardinal by a well-defined fissure; anterior tooth approximate; sinus short, curved at end.

Long. 0.86; Lat. 0.90; Diam. 0.53 inches.

" 21; " 22; " 13 mill.

Hab. South America? (Cabinet of Prime.)

Compared with *C. regalis*, it is larger, transversely shorter, less heavy, less produced on the posterior side, fuller, the beaks are more prominent, the striæ are less regular and more delicate, the epidermis is not so greenish in color. Smaller and less full than *C. radiata* and *C. solida*. A rare species.

14. *Cyrena nitidula*, DESHAYES.—Shell transversely oval, fragile, inequilateral; anterior side shorter, rounded at end; posterior side rounded or subtruncated; striæ light; epidermis greenish; beaks tumid, acute, opposite; valves light, somewhat compressed; interior pale violet; sinus short, triangular, acute; hinge-margin very narrow; cardinal teeth unequal, divergent, narrow, bifid; lateral teeth subequal, small.

Long. 1.12; Lat. 1.00; Diam. 0.68 inches.

" 28; " 25; " 17 mill.

Hab. South America? (Cabinet of Cuming.)

Cyrena nitidula, DESHAYES, Proc. Zool. XXII, 1854, 23.

The specimen in the collection of Mr. Cuming, from which this description was prepared, has no locality assigned to it; the fact of its having a sinus places it without a doubt among the species from America, and I am strongly inclined to think that it is a native of South America.

15. *Cyrena placens*, HANLEY.—*C. testa suborbiculari, subventricosa, inæquilaterali, nitida, concentrice, sulcato-striata, epidermide irridoflavescente induta; margine ventrali convexo; dorsali, utrinque declivi et convexiusculo; natibus erosis; ligamento fulvo, depresso, angusto; lumula nulla; superficie interna purpurea; dentibus lateralibus minutissime rugulosis haud autem crenatis, antico brevi et subapproximato.*

Long. 1.75; Lat. 1.50 inches.

Hab. South America? (Cabinets of Hanley and the Jardin des Plantes.)

Cyrena placens, HANLEY, Proc. Zool. XII, 1844, 160.—Index test. suppl. pl. xiv, f. 52.

I have not been able to identify this species, which Mr. Hanley informs me is very rare, the shell labelled as such in the cabinet of Mr. Cuming, he says is not the true *C. placens*.

"A beautiful and rare species, of which I have never seen but my own specimen and that in the Jardin des Plantes at Paris. The sulci are close and regular, and the outline of the shell, although not very unlike that of *C. radiata*, is convex in front of the beaks, thus rendering the front extremity broad and somewhat obtuse."—*Hanley*.

I have reason to believe that this species is closely allied to *C. fontainei*.

16. *Cyrena fontainei*, CARPENTER.—Shell trigonal, solid, compressed, inequilateral; anterior side short, rounded; posterior narrow; acute and angular at extremity; beaks small, acute, eroded; striæ fine, regular, epidermis smooth, chestnut-brown; interior of the valves light-blue; hinge-margin curved, thick; cardinal teeth large, unequal, divergent, the anterior ones bifid; lateral teeth unequal, anterior proximate, conical, posterior distant, elongated, compressed.

Fig. 16.



C. fontainei.

Long. 1.66; Lat. 1.40; Diam. 0.80 inches.

" 41; " 35; " 20 mill.

Hab. South America. (Cabinets of Cuming, Jay and Prime.)

Cyclas fontainei, D'ORB. Voy. Amer. 1844, 569, pl. 83, f. 14, 15.

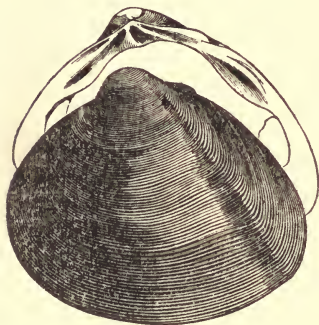
Cyrena fontainei, CARP. Mazatlan Shells, 1857, 114.

Compared with *C. olivacea*, with which this species has been confounded, its outline is more regular, it is smaller, more compressed, the beaks are smaller and more acute, the epidermis is smoother and of a different color. A rare species.

17. *Cyrena acuta*, PRIME.—Shell trigonal, oblique, transversely elongated, very inequilateral, somewhat compressed, solid; anterior side short, rounded at end; posterior side produced, angular at end; beaks tu

mid, inclined anteriorly, approximate at apex, somewhat eroded; striæ

Fig. 17.



C. acuta.

heavy, very regular; epidermis light brown; valves thick, interior variable, pale salmon or dark violet; hinge-margin curved, moderately broad; cardinal teeth unequal, divergent, simple; lateral teeth elongated, subequal, posterior tooth a little more elongated and depressed and slightly more distant from the cardinal teeth; sinus narrow, curved and acute at extremity.

Long. 1.64; Lat. 1.44; Diam. 0.88 inches.

Long. 41; Lat. 36; Diam. 22 mill.

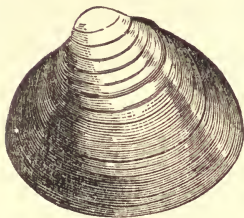
Hab. Central America. (Cabinet of Prime.)

Cyrena acuta, PRIME, II. Conch. IX, 1861, 355—X, 1862, 387, pl. xiv, f. 1.

A rare and fine species, easily distinguished from others by the great prolongation of the posterior side.

18. *Cyrena mexicana*, SOWERBY.—Shell small, rounded oval or

Fig. 18.



C. mexicana.

elliptical, subequilateral; anterior side a little the shorter, broader, rounded, posterior side narrower, subangular at end; beaks medium size, somewhat raised, inclined towards the anterior, generally eroded; valves moderately convex, interior white, with at times purple markings on the margins and on the hinge; epidermis very variable, rough or smooth, color dingy gray or light yellowish-green; striæ generally light; hinge thick, three unequal cardinal teeth; the anterior lateral tooth acute, short, the posterior elongated; sinus long and narrow.

Long. 1.25; Lat. 1.12; Diam. 1.18 inches.

" 32; " 28; " 29 mill.

Hab. North America, at Mazatlan and Panama. Guyana? (Cabinets of the British Museum, Smithsonian Institution, Cuming, State of New York, and Prime.)

Cyrena mexicana, SOWB. Zool. II. 1829, 364.—CARP. (pars) Mazatlan Shells, 1857, 115.

Cyrena fragilis, DESHAYES, Mus. Cuming.

Cyrena æquilateralis, DESHAYES, Proc. Zool. XXII, 1854, 20.

Cyrena varians, CARPENTER, in litt.

This species varies very much in external appearance, being, at times, more convex than the specimen from which this description was prepared; I have a young *C. mexicana* which is quite globose. The epidermis is usually light yellowish-green and smooth, but in some cases it is of a dingy gray color and rough.

The original type of Mr. Sowerby's *C. mexicana* having been lost, some confusion has arisen as to the identification of this species; the description he gives of it, though quite short, contains sufficient, taking the locality into consideration, to induce me to believe that the shell under consideration is the one he had in view in describing his species.

Mr. Carpenter includes under the head of *C. mexicana* the *C. altilis*, Gould, or rather the *C. triangula*, v. d. Busch, as it should be called, both being identical. I have examined an original specimen of *C. altilis*, and am convinced that it is different from *C. mexicana*. I have also examined, at the State Collection in Albany, a complete suite of *C. mexicana* arranged by Mr. Carpenter himself, and find that though at times certain extreme forms of *C. mexicana* and *C. triangula* bear great affinities to each other, the two types are very distinct and may be separated without much trouble. The *C. triangula* is always more triangular, larger and more solid than *C. mexicana*, and its beaks are more prominent.

The *C. floridana*, which Mr. Carpenter places under the synonymy of this species, is an entirely different shell.

I have seen original specimens of *C. fragilis*, Desh., and of *C. æquilateralis*, Desh., in the Cuming Collection, and find them identical with *C. mexicana*. The *C. æquilateralis* is assigned as coming from Guyana, an error, in my opinion. The *C. mexicana* is, on the whole, an attractive species; it is found quite abundantly.

19. Cyrena californica, PRIME. — Shell ovate-subquadrangular, transverse, inequilateral, tumid, somewhat heavy; anterior side produced towards the upper part, obliquely subtruncate, posterior side broadly truncated towards the upper part and angular towards the inferior part, basal margin rounded; beaks not much raised, somewhat oblique, eroded; striæ light, irregular; epidermis yellowish-green; valves white inside with violet on the margins; hinge-margin somewhat broad; cardinal teeth divergent, narrow, approximate at base; lateral teeth unequal; anterior tooth thick, conical, short; posterior tooth narrow, placed at a greater distance from the cardinal teeth.

Long. 1.81; Lat. 1.56; Diam. 1.20 inches.

" 45; " 39; " 30 mill.

Hab. North America, in the State of California. (Cabinet of Cuming.)

Cyrena subquadrata, DESH. (preoc.) Proc. Zool. XXII, 1854, 21.

Cyrena californiensis, PRIME, Proc. Ac. N. S. Phil. 1860, 276.

The only specimen I have seen of this rare species is the one in the collection of Mr. Cuming. In shape this shell is somewhat like that of the *C. radiata*, but otherwise they are widely distinct; it is very different from all other species of the genus.

20. *Cyrena panamensis*, PRIME.—Shell orbicular-subtrigonal, heart-shaped, ventricose, inequilateral; anterior side short, concave on the upper part, produced and rounded in front; posterior side broader, obliquely truncated, obtuse at extremity; beaks large, very prominent, opposite, approximate at apex; striæ light, irregular; epidermis brownish-green; hinge-margin very narrow; cardinal teeth unequal, small, divergent; anterior lateral tooth thicker than the posterior.

Long. 2.20; Lat. 2.08; Diam. 1.68 inches.

" 55; " 52; " 42 mill.

Hab. Central America, at Panama. (Cabinets of the British Museum and Cuming.)

Cyrena inflata, DESHAYES, (preoc.) Proc. Zool. XXII, 1854, 23.

Cyrena panamensis, PRIME, Proc. Ac. N. S. Phil. 1860, 283.

A rare shell, the only specimen I have seen is the one from Mr. Cuming's collection. Compared with *C. cumingii* it is smaller, more tumid, transversely less elongated; it differs from *C. maritima* in being more tumid, transversely shorter, and in having more prominent beaks.

21. *Cyrena reclusii*, PRIME.—Shell heart-shaped, inflated, subequilateral, tumid; anterior side rounded; posterior side subtruncate; beaks prominent, inclined anteriorly, approximate at apex; lunula obsolete; striæ irregular; epidermis dark brownish-green; valves solid, full, interior whitish; hinge-margin curved, broad; cardinal teeth unequal, divergent, bifid; anterior lateral tooth narrow, robust, nearer the cardinal teeth; posterior tooth lamellar, distant.

Fig. 19.



C. reclusii.

Long. 2.96; Lat. 2.96; Diam. 2.20 inches.

" 74; " 74; " 55 mill.

Hab. Central America. (Cabinet of Cuming.)

Cyrena cordiformis, RECLUZ, (preoc.) II. Conch. IV, 1853, 251, pl. vii, f. 9.

The only specimen I have seen of this species, is the one in the cabinet of Mr. Cuming. Mr. Recluz does not assign any locality to it, but I am satisfied on careful inspection that it comes from Central America. Compared with *C. inflata*, it is heavier, more inflated and more heart-shaped.

22. *Cyrena cumingii*, DESHAYES.—Shell ovate-subtrigonal, inequilateral, tumid, heart-shaped; anterior side short, broadly rounded; posterior side longer, truncated at extremity; beaks large, prominent, opposite, approximate at apex, eroded; valves rather solid, interior white; striæ light and irregular; epidermis brownish-green; hinge-margin narrow, somewhat broad in the centre; cardinal teeth approximate, narrow, unequal, bifid; lateral teeth large, equidistant from the cardinal teeth, anterior tooth larger, conical, acute.

Long. 2.40; Lat. 2.08; Diam. 1.76 inches.

“ 60; “ 52; “ 44 mill.

Hab. Central America. (Cabinet of Cuming.)

Cyrena cumingii, DESHAYES, Proc. Zool. XXII, 1854, 22.

A rare shell, the only specimen I have met with is the one in Mr. Cuming's collection. Compared with *C. maritima*, it differs in having an epidermis, in being larger, transversely more elongated and less inflated.

23. *Cyrena isocardioides*, DESHAYES.—Shell orbicular-subtrigonal, inflated, heart-shaped, light, fragile; anterior side a regular and broad semicircle; posterior side forming on the upper part a declivity, subtruncated at extremity; striæ light, irregular; epidermis olive-color with zones of black; beaks large, curved inwards, opposite, tinted with violet; hinge-margin very narrow; cardinal teeth very small, approximate, subequal, the two anterior ones parallel, the posterior divergent; lateral teeth small, situated at about the same distance from the cardinal teeth; valves white inside, with markings of violet on the margins.

Long. 2.16; Lat. 2.12; Diam. 1.60 inches.

“ 54; “ 53; “ 41 mill.

Hab. South America, in Western Columbia. (Cabinet of Cuming.)

Cyrena isocardioides, DESH. Proc. Zool. XXII, 1854, 22.

A rare species, the only specimen I have seen is the one in Mr. Cuming's collection; it presents great affinity to *C. recluzii* in

shape and bulk; it differs, however, in being very much less heavy and solid; the hinge-margin is narrower and the teeth are smaller and slighter.

24. *Cyrena tumida*, PRIME.—Shell trigonal, inflated, equilateral, somewhat solid; anterior margin convex, obtuse, subangular; posterior margin convex, presenting a declivity on the upper part, angular, subrostrated; inferior margin ventricose; epidermis dark; beaks very small, depressed, opposite; hinge-margin narrow; cardinal teeth small, narrow, the two larger ones bifid; lateral teeth unequal, compressed, the anterior one large, acute, triangular; valves white in the interior with a rosy hue.

Long. 1.36; Lat. 1.20; Diam. 0.80 inches.

“ 34; “ 30; “ 20 mill.

Hab. Central America. (Cabinet of Cuming.)

Cyrena angulata, DESH. (preoc.) Proc. Zool. XXII, 1854, 22.

The only specimen I have seen of this species is the one in the collection of Mr. Cuming.

25. *Cyrena pullastra*, MÖRCH.—C. testa ovalis, tenuis, albescens, radiatim subtilissime striata, valde inæquilateralis, convexiuscula, antice brevissime angustata, postice late rotundata, margo dorsalis anticus precipite declivis, posticus rectus fere horizontalis, postice angulo obtuso; margo ventralis parum arcuatus; area postice violacea tincta; dens lateralis posticus valvæ sinistræ remotissimus, compressus, inter lamina 2 valvæ dextræ receptus; dens anticus subapproximatus; sinus syphonalis angustissimus, sursum spectans.

Long. 30; Lat. 23 mill.

Hab. Central America, at Realejo in Nicaragua. (Cabinet of Mörch.)

Cyrena (Polymesoda) pullastra, MÖRCH, Malak. Bl. VII, 1860, 194.)

I have not been able to identify this species. I know of no *Cyrena* from Realejo to which the above description would apply.

26. *Cyrenâ inflata*, PHILIPPI.—C. testa ovato-trigona, valde tumida, tenui, irregulariter transversim striata, epidermide olivaceo-nigrescente vestita; extremitate postica elongata; apice subtruncata; margine ventrali parum arcuato; apicibus valde prominentibus, involutis, decorticatis; dentibus cardinis lateralibus integris, in valva dextra abrupte terminatis; paginâ interna alba.

Long. 28½''' ; Alt. 26½''' ; Crass. 21½'''.

Hab. Central America, in Costa Rica. (Cabinet of v. d. Busch.)

Cyrena inflata, PHILIPPI, Zeit. Malak. 1851, 71.

"Species forma inflata, testa tenui, apicibus prominentibus ab affinis valde recedit, et *Isocardiam cor* in mentem vocat."

I have not been able to identify this species.

27. *Cyrena boliviiana*, PHILIPPI.—C. testa subtrigona, valde inæquilatera, regulariter transversim undato sulcata, epidermide olivacea vestita, extremitate antica rotundata, postica acute angulata rostrata; margine dorsali postico longissimo, parum arcuato; medio lunulæ tumido; apicibus integris; dentibus lateralibus abbreviatis integris; cardinalibus integris; pagina interna violaceo-suffusa; sinu palliari distincto angusto.

Long. 16''' ; Alt. 14''' ; Crass. 8'''.

Hab. South America, in Bolivia. (Cabinet of Largilliert.)

Cyrena boliviiana, PHILIPPI, Zeit. Malak. 1851, 70.

I have not been able to identify this species.

b. ANOMALOUS SPECIES.

28. *Cyrena maritima*, C. B. ADAMS.—Shell orbicular-heart-shaped, inequilateral, solid; anterior side short, rounded; posterior side produced, truncated at extremity; beaks large, inclined anteriorly, approximate at apex, acute, not eroded; valves very full, whitish inside; striæ coarse, irregular; epidermis greenish-brown, worn on the upper portion of the shell; hinge-margin narrow, not much curved; cardinal teeth small, narrow, subequal, divergent, bifid; lateral teeth depressed, at about the same distance from the cardinal teeth, a small narrow indentation leads from the anterior tooth to the cardinal teeth; sinus not distinguishable.

Long. 2.26; Lat. 1.94; Diam. 1.44 inches.

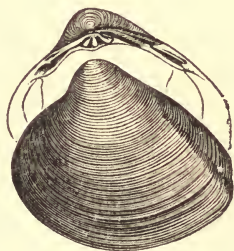
" 56; " 48; " 36 mill.

Hab. Central America, at Panama. (Cabinets of Amherst College, Cuming and Prime.)

Cyrena maritima, C. B. ADAMS, Ann. N. Y. Lyc. V, 1852, 499.

The late Professor Adams, from whom I obtained my specimen of this species, says of it, "its station is in impalpable mud under bushes at high-water mark where a small stream emptied; some of the dead shells have balani growing upon them; nine specimens were collected at two-and-a-half miles east of Panama."

Fig. 20.



C. maritima.

Like all the species of this genus which live in estuaries, it is nearly entirely deprived of epidermis, some few remnants of it only existing on the margins of the shell. The *C. maritima* is very much larger than any of the so-called marine *Cyrenæ* known to us, and is not likely to be confounded with any of them.

29. *Cyrena notabilis*, DESHAYES.—Shell transversely rounded, subquadrilateral, somewhat depressed, inequilateral; anterior side short, obtuse; posterior side broadly truncate; superior and inferior margins straight, parallel; beaks oblique, not eroded, approximate at apex; striæ light, irregular; epidermis greenish; valves solid, interior white with a broad patch of dark violet on the upper portion of the posterior margin; ligament elongated, cylindrical; cardinal teeth unequal, oblique, bifid; anterior lateral tooth small, conical, posterior tooth somewhat obsolete, more distant from the cardinal teeth.

Long. 2.31; Lat. 1.87; Diam. 1.43 inches.

“ 58; “ 48; “ 37 mill.

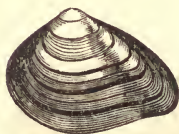
Hab. South America, in Peru. (Cabinet of Cuming.)

Cyrena notabilis, DESH. Proc. Zool. XXII, 1854, 21.

Mr. Cuming possesses the only specimen I have seen of this species, which is found at the mouths of rivers. Compared with *C. obscura* it is more quadrangular and less tumid; it differs very materially from *C. maritima* and *C. anomala*, and it is much larger and heavier than any other of the estuarian species.

30. *Cyrena floridana*, CONRAD.—Shell trigonal, inequilateral, cuneiform; anterior side the shorter, somewhat produced, rounded; posterior side angular, subtruncate at end, with an obtuse fold near the margin; basal margin curved, irregular; beaks small, approximate at apex, curved inwardly, entire; lunula somewhat marked; striæ irregular, coarse especially towards the posterior margin where they assume the shape of folds; epidermis wanting; hinge-margin very much curved; cardinal teeth

Fig. 21.



C. floridana.

subequal, divergent; anterior lateral tooth sharp; posterior lateral tooth narrow, elongate; valves solid, moderately inflated, exterior pale violet, interior rough, whitish pink with dark violet bands on the margins; sinus not visible.

Long. 1.12; Lat. 0.81; Diam. 0.48 inches.

“ 28; “ 20; “ 12 mill.

Hab. North America, at Tampa Bay, in the State of Florida. (Cabinets of Phillips and Prime.)

Cyrena floridana, CONRAD, Proc. Ac. N. S. Phil. III, 1846, 23, pl. 1, f. 1.

This species has no epidermis, and presents many of the characters of a marine shell; compared with *C. salmacida*, which is about of the same size, it differs in being irregular in outline, less elongated and of a somewhat different color; it is smaller and coarser than *C. maritima*, and larger than either *C. colorata* or *C. cubensis*.

31. *Cyrena cubensis*, PRIME.—Shell small, trigonal, compressed; anterior side short, rounded; posterior side produced, subangular; beaks small, raised, inclined towards the anterior, not eroded; striæ fine; epidermis wanting; color violet; hinge-margin broad; cardinal teeth diverging; valves solid, interior salmon color.

Long. 0.60 inch.

" 15 mill.

Hab. North America, in the Island of Cuba. (Cabinet of ?.)

Cyclas maritima, D'ORB. Moll. Cuba, II, 1853, 280, pl. xxi, f. 47-50.

This species presents the appearance of a marine shell; compared with *C. floridana* it is smaller and more regular in outline; it is larger and more solid than *C. colorata*; it is smaller, less inflated and more highly colored than *C. maritima*, and smaller and more inflated than *C. salmacida*.

32. *Cyrena salmacida*, MORELET.—Shell inequilateral, oval, solid, elongated; anterior side short, rounded; posterior elongated, subabrupt at end; beaks small; striæ irregular, not heavy; epidermis wanting, exterior of valves whitish or flesh-colored; hinge-margin narrow; cardinal teeth small; lateral teeth small, elongated.

Long. 1.08; Lat. 0.76 inches.

" 27; " 19 mill.

Hab. Central America, near the Port of Sisal, in Yucatan. (Cabinets of Morelet and Cuming.)

Cyrena salmacida, MORELET, Test. nov. Cub. pt. 2, 1851, 26.

The specimens collected by the author, which have passed through my hands, were found in salt-water marshes. A rare



Fig. 22.
C. salmacida.

species. In outline it offers some resemblance with *C. colorata*, it is, however, larger, more inflated and very much more solid.

- 33. *Cyrena colorata*, PRIME.**—Shell very small, fragile, elongated, cuneiform, very inequilateral, compressed, anterior side broader, rounded; posterior side longer, produced, subabrupt at extremity; beaks small, acute; striæ very fine, hardly visible; color variable, whitish with zones of purple, or orange; epidermis wanting; hinge-margin nearly straight, narrow, teeth small and delicate; cardinal teeth unequal, divergent, anterior tooth rudimentary, posterior ones bifid; lateral teeth unequal, elongated, narrow.

Fig. 23.

*C. colorata.*

Long. 0.80; Lat. 0.52; Diam. 0.28 inches.

“ 20; “ 13; “ 7 mill.

Hab. The West Indies, in the Island of New Providence. (Cabinets of the Smithsonian Institution, Cooper, Browne and Prime.)

The external appearance of this species presents all the character of a marine shell, its denticulation, however, places it without a question in the genus *Cyrena*. Mr. W. Cooper, of Hoboken, its discoverer, found several specimens of it in a brackish pond, living in company with some *Cerithia*. It is smaller, more fragile, less inflated and more regular in outline than either *C. floridana*, *C. salmacida* or *C. cubensis*.

- 34. *Cyrena anomala*, DESHAYES.**—Shell trigonal, very much inflated, heart-shaped, very inequilateral, striæ very fine, regular, hardly perceptible; epidermis light grayish green; beaks large, acute, inclined inwards; anterior side short, broadly semi-circular; posterior side extended, conical, acute and angular at extremity; valves very fragile, interior grayish with markings of violet; hinge-margin rounded, very narrow; cardinal teeth very small, approximate, subequal, divergent, the central tooth bifid; lateral teeth subequal, distant, compressed; sinus very small, barely visible.

Fig. 24.

*C. anomala.*

Long. 2.00; Lat. 1.60; Diam. 1.36 inches.

“ 50; “ 40; “ 34 mill.

Hab. South America, in Peru. (Cabinets of Cuming and Prime.)

Cyrena anomala, DESH. Proc. Zool. XXII, 1854, 21.

Cyrena peruviana, DESH. Bivalv. Brit. Mus. 1854, 257.

A very rare species, the only specimens I have seen being the one in Mr. Cuming's cabinet and a young one in my own, which was received from him. It is easily distinguished from all others by the peculiar outline of the posterior side which terminates in a very acute angle. The shell marked *C. peruviana* in Mr. Cuming's collection, from which Mr. Deshayes described it, belongs without doubt to the species above.

FOSSIL SPECIES.

35. *Cyrena densata*, CONRAD.—"Shell subtriangular, thick, convex; anterior margin obtusely rounded; basal margin profoundly and regularly curved to the posterior extremity, which is subtruncated, direct, and greatly above the line of the base; beaks central, summits elevated; striæ robust; teeth large, robust, very prominent; middle tooth of the right valve bifid; lateral teeth elongated, robust, anterior tooth truncated, suddenly deflected at the extremity, posterior tooth distant."

Long. 1.87; Lat. 1.80 inches.

Hab. North America, at Petersburg, in the State of Virginia. Tertiary formation. (Cabinet of ?.)

Cyrena densata, CONRAD, Proc. Ac. N. S. Phil. 1, 1845, 324.

36. *Cyrena dakotensis*, MEEK and HAYDEN.—"Shell suborbicular, or broad ovate-subtrigonal, moderately convex; anterior and posterior sides rather abruptly rounded; base forming a semi-oval curve; dorsal outline sloping from the beaks, the anterior slope being a little concave, and the posterior convex in outline; beaks rather elevated and subcentral; anterior muscular impression narrow, ovate, well defined; posterior broader and more shallow: palleal line distinct, nearly simple, or very faintly sinuous just beneath the posterior muscular scar; surface marked by more or less distinct concentric striæ."

Long. 1.20; Lat. 1; Diam. 0.58 inches.

Hab. North America, at the mouth of the Big Sioux or Dakotah River. Dakotah group of the Nebraska and Dakotah cretaceous series. (Cabinet of the Smithsonian Institution.)

Cyprina arenaria, MEEK & HAYDEN, Proc. Ac. N. S. Phil. 1857, 143.

SPHÆRIUM, SCOPOLI.¹

Pectunculus, LISTER, 1685.—*Musculus*, GUALT. 1742.—*Tellina*, LINN. 1758.—*Sphærium*, SCOP. 1777.—*Cardium*, DA COSTA, 1778.—*Cyclas*, BRUG. 1792.—*Nux*, HUMPHR. 1797.—*Musculium*, LINK, 1807.—*Cornea*, PISUM, MEGERLE, 1811.—*Corneocyclas*, FER. 1818.—*Amesoda*, RAFIN. 1820.—*Pisidium*, VERANY, 1846.—*Cycladites*, KRUG. 1848.

Animal oval, lobes of the mantle simple, united posteriorly, and terminating in two short syphons, joined at their base, without tentacles; mouth oval-shaped, small; tentacles of the mouth short and narrow; gills rather broad, nearly equal, united behind the foot; foot narrow, elongated.

Shell oval, nearly equilateral; beaks somewhat inflated and prominent; hinge-margin narrow, with two primary teeth in each valve; lateral teeth elongated; pallial impression simple; ligament external, narrow, situated on the longer portion of the shell.

The genus *Sphærium* was characterized under its present name by Scopoli, in 1777; since that time, however, it has received various denominations, and the one under which it has been most generally known, that of *Cyclas*, was applied to it in 1792 by Bruguière. Mr. Gray revived the term of *Sphærium* in 1847, and his example has been followed by the conchologists of the continent of Europe. I was the first in this country to discard the name of *Cyclas* for that of *Sphærium*.

The species composing this genus are small bivalves inhabiting rivers, lakes, streams, and still waters; they are plentifully distributed all over the globe, but as far as present experience goes, seem to be more abundant on the northern portion of this hemisphere than elsewhere.

The shell is transversely oval, nearly equilateral, thin, fragile, sometimes translucent, with beaks more or less raised; its entire surface is transversely striated and covered with a light epidermis varying in color; the margins are rounded, obtuse or angular. The interior of the valves is smooth and varies in color; the muscular impressions are not very distinct; the posterior one is slightly

¹ Introduct. ad. Hist. Nat. 1777, 397.

the largest; the pallear impression is parallel with the basal margin; it is narrow and always simple. The hinge-margin is very variable; it is usually composed of two small teeth in each valve; at times, however, they are single in one and double in the other, or else single in both valves; these teeth are occasionally rudimentary, or even nearly obsolete. The lateral teeth placed on each side of the cardinal teeth are double in the right valve and single in the left one; the anterior lateral tooth is usually the shorter. The ligament is external; it is short, not very conspicuous, and is always found on the longer portion of the shell.

The animal of *Sphærium* has a broad foot, capable of considerable extension; it uses it either to bore holes in the mud, in which it sinks the posterior portion of the shell, or as means of locomotion. The syphonal tube is double and very retractile; it is often white like the foot, but at times it is colored.

The habits of these molluscs are very similar to those of *Pisidium*, with which they are often found living. The species of *Sphærium* are less abundant in individuals than those of *Pisidium*; they are also less generally distributed, and are more confined to certain localities than the latter.

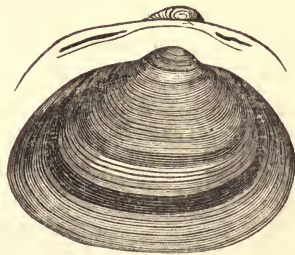
a. BEAKS ROUNDED, NEVER TUBERCULAR.

1. *Sphærium sulcatum*, LAMARCK. — Animal white, tubes a light orange color.

Shell transversely oval, nearly equilateral, light in texture for its size; posterior margin somewhat more pointed; anterior rounded, base slightly curved; valves convex; beaks full, raised above the outline of the shell; posterior portion a little longer; sulcations coarse, regular; epidermis dark chestnut-brown; interior light blue; hinge-margin narrow, nearly a straight line; cardinal teeth small, indistinct, situated somewhat towards the anterior side, double in both valves, and so placed as to assume the shape of the letter V reversed; lateral teeth on a line with the primary teeth, large, strong and prominent.

The young is more equilateral than the adult; more compressed; it presents the shape of a quadrilateral, it is of a light lemon color, the striations are as heavy as those of the mature shell.

Fig. 25.



Sph. sulcatum.

Long. 0.68; Lat. 0.43; Diam. 0.31 inches.

Hab. North America, in the New England States, in the States of New York, New Jersey, Pennsylvania, Ohio, Michigan, Wisconsin, Iowa, Minnesota and Alabama, and in Canada. (Cabinets of the Academy of Natural Sciences of Philadelphia, Smithsonian Institution, Garden of Plants in Paris, Museum Delessert, Jay, Prime and others.)

Cyclas sulcata, LAMARCK, An. s. vert. V, 1818, 560.

Cyclas saratogea, LAMARCK, loc. sub. cit. V, 1818, 560.

Cyclas similis, SAY, Nich. Encycl. Amer. edit. IX, 1818, pl. 1, f. 9.

Cyclas lasmampsis, RAFINESQUE, Il. scie. Phys. IX, 1820, 319, pl. 82, f. 19, 20.

Cyclas solida, DEKAY, Rept. 1842, 220, pl. xxv, f. 265.

Cyclas gigantea, PRIME, Bost. Proc. IV, 1851, 157.

Cyclas ponderosa, PRIME, loc. sub. cit. IV, 1851, 157.

Cyclas striatina, LAMARCK, Fer. in Mag. Zool. 1835.

Cyclas rhomboidea, SAY, C. B. ADAMS, Vermont cat. 1842, 18.

This, our most common and widely distributed species, living as it does in so many different sections of the country, presents at times great variations in size, color and general appearance. It can, however, be easily recognized by its very elongated and equilateral form, and by the beaks which are uniformly full and convex; they are often eroded. The young is often of a uniform light lemon color, which, as the shell matures, becomes gradually darker from the beaks downwards until the new shade covers the whole surface of the shell; in certain intermediate stages of growth, the shell is marked with a zone of yellow on the inferior margin; the color of the adult varies from a greenish-brown to a dark chestnut. The young shell has at times, owing to the variations which exist between it and the adult, been taken for a different species; by some it has been taken for the *S. rhomboideum*.

The hinge-margin is generally straight. I have specimens, however, from Alabama, Pennsylvania and Rhode Island, in which it is slightly curved. One of the distinctive characters of this species is that the lateral teeth are never placed at an angle with the cardinal teeth; they are generally on a straight line with them.

The finest specimens I have seen of the *S. sulcatum* were sent to me by Mr. Ingalls, who had collected them in Washington County, New York; they were remarkably convex, and measured as much in length as $\frac{1\frac{3}{4}}{16}$ of an inch; the beaks were very full, and much raised above the margin of the shell.

This species was first described in 1818, by Lamarck, under the names of *C. sulcata* and *C. saratogea*. Say, in 1819, ignorant that this shell was known to conchologists, described it as the *C. similis*, under which name, until very recently, it has been most generally known. Say also figured this species, but his figure, I regret to say, is not correct, and would be more apt to give one the idea of a *Pisidium* than of a *Sphærium*. The description by Say of the *C. similis* applies perfectly to the shell under consideration, of which Dr. Gould has given a very good figure in his Report on the Invertebrata of Massachusetts.

As related elsewhere,¹ I had an opportunity, some years since, while in Paris, to see Lamarck's original specimens of the *C. sulcata* and *saratogea*, at the Garden of Plants, and at the Delessert Museum; and to convince myself by examination that they both belonged to one species, and were identical with Say's *C. similis*.

2. *Sphærium aureum*, PRIME.—Animal not observed.

Shell transversely oval, slightly elongated, nearly equilateral, heavy, convex; beaks full, raised above the outline of the shell; anterior margin broad and rounded; posterior narrower and somewhat angular; inferior slightly curved; hinge-margin somewhat broad, curved; cardinal teeth diminutive, double, so placed together as to represent the form of the letter V reversed, and rather wide-spread; lateral teeth situated each one at an angle with the cardinal teeth, strong and large; sulcations deep, not very regular; epidermis varying from a greenish-yellow to a bright gold color, slightly lustrous; interior of the valves bluish-white.

Long. 0.56; Lat. 0.43; Diam. 0.37 inches.

Hab. North America, from Lake Superior? (Cabinets of Agassiz, Smithsonian Institution and Prime.)

Cyclas aurea, PRIME, Bost. Proc. IV, 1851, 159.

This is one of our most attractive species, but also one of the rarest. It is supposed to have been brought from Lake Superior by the expedition which visited that region under Professor Agassiz. In general outline it offers some similarities with the *S. sulcatum*; it is, however, a much more ponderous shell; it is less elongated, more convex, its sulcations are not so regular, its

Fig. 26.



S. aureum.

¹ Notes on some American species of *Cyclas*, &c., by Temple Prime, the Hague, 1857. 8vo.

color is different, and lastly, its hinge-margin is much more curved.

Compared with *S. solidulum*, it is more convex, more elongated, its posterior margin is broader, the hinge-margin is not so much curved, the beaks are fuller, and the sulcations are not quite so heavy; the color is also different.

3. *Sphærium solidulum*, PRIME.—Animal not observed.

Shell transversely inequilateral, elongated, slightly convex; beaks full,

Fig. 27.



S. solidulum.

not very prominent; anterior margin rounded; posterior drawn out to an angle; base slightly curved; epidermis variable, dark chestnut or brownish-yellow, with sometimes a yellow zone on the basal margin; sulcations coarse, irregular; interior dark blue; hinge-margin considerably curved; cardinal teeth double, in the shape of the letter V reversed; lateral teeth large; the anterior placed at an angle with the margin; the posterior more on a continuation of the curve.

Long. 0.56; Lat. 0.43; Diam. 0.31 inches.

Hab. North America, in the States of New York, New Jersey, Ohio, Maryland, Virginia, Indiana and Wisconsin. (Cabinets of the Academy of Natural Sciences of Philadelphia, Smithsonian Institution, Jay and Prime.)

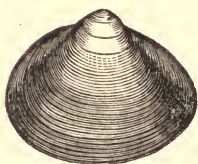
Cyclas solidula, PRIME, Bost. Proc. IV. 1851, 158.

Cyclas distorta, PRIME, loc. sub. cit. IV, 1851, 158.

This species, which is not uncommon, was probably confounded by our early conchologists with *S. sulcatum*; it differs from that species, however, in being less elongated, more inequilateral, less convex, the hinge-margin is more curved, and the shell is more solid.

4. *Sphærium triangulare*, SAY.—Animal not observed.

Fig. 28.



S. triangulare.

Shell transversely oval, nearly equilateral, rather full, anterior margin slightly distended, rounded, posterior somewhat abrupt, basal rounded; beaks large, full, prominent; lines of growth regular, epidermis brownish; hinge-margin narrow, curved; cardinal teeth very distinct, assuming the shape of the letter V reversed; lateral teeth prominent.

Long. 0.56; Lat. 0.43; Diam. 0.25 inches.

Hab. North America, in Mexico. (Cabinet of the Academy of Natural Sciences of Philadelphia.)

Cyclas triangularis, SAY, New Harm. Dissem. 1829, 356.

The specimens from which I have prepared this description were presented to the Academy of Natural Sciences of Philadelphia by Mrs. Say, as the *C. triangularis*, Say; they may or may not be true representatives of Say's species. In many points they answer his description of the *C. triangularis*, but at the same time I am not able to reconcile their shape, which is not more triangular than that of any other species, with the name he has applied to the species. Moreover, they bear a very strong resemblance to one of our Northern *Sphærium*, the *S. solidulum*; they differ from it, however, in being less heavily and more regularly striated, and in having more prominent beaks.

5. *Sphærium striatinum*, LAMARCK.—

Animal white, tubes light reddish yellow.

Shell slight, transversely elongated, somewhat compressed, inequilateral; anterior margin rounded, posterior distended, inferior rounded; beaks full, not much raised; sulcations irregular, at times so light as hardly to be seen with the naked eye, thus giving the shell a lustrous appearance; color varying from a light greenish-yellow to a darker shade; valves slight; interior blue; hinge-margin slightly curved; cardinal teeth double, very small, of the same size; lateral teeth larger, not very prominent.

Long. 0.43; Lat. 0.31; Diam. 0.25 inches.

Hab. North America, in the States of New York, Connecticut, New Jersey, Pennsylvania, Michigan, Illinois, Ohio, Wisconsin, Alabama, Tennessee, Iowa, in the Hell Gate River, Washington Territory, and in Canada. (Cabinets of the Academy of Natural Sciences of Philadelphia, Smithsonian Institution, Jay, Prime, and others.)

Cyclas striatina, LAMARCK, An. s. vert. V, 1818, 560.

Cyclas edentula, SAY, N. Harm. Dissem. 1829, 2.

Cyclas cornea, LAMARCK, C. B. Adam's Cat. 1847.

Cyclas albula, PRIME, Bost. Proc. IV, 1851, 155.

Cyclas tenuistriata, PRIME, loc. sub. cit. IV, 1851, 156.

Cyclas acuminata, PRIME, loc. sub. cit. IV, 1851, 158.

Cyclas inornata, PRIME, loc. sub. cit. IV, 1851, 159.

Cyclas simplex, PRIME, loc. sub. cit. IV, 1851, 159.

Cyclas modesta, PRIME, loc. sub. cit. IV, 1851, 159.

Fig. 29.



S. striatinum.

As may be seen by the above synonymy, I have been induced to unite under this species several which I described as distinct in

1851. The differences existing between these shells are at times quite marked, but in general characters they agree, and I am inclined to believe that these differences owe their origin solely to local causes.

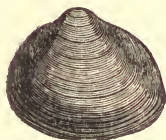
I had occasion some time since to convince myself of the identity of the *S. striatinum* with the *C. edentula* of Say.¹

This species, which is not un plentiful in the localities where it is found, varies much in size, color, and external appearance generally. The shell from Connecticut is so slight, that it is nearly translucent, and the striæ are so light as to impart to it a lustrous appearance; on the other hand, I have specimens from the Hoosack, which are quite heavy and coarsely striated; in the main, however, they all seem to tally. The variety from Alabama, described as the *C. tenuistriata*, is less distended, is fuller, and the sulcations are hardly perceptible.

Compared with *S. solidulum*, this species is smaller, more inequilateral, less tumid, more compressed, less solid, less heavily sulcated, and its posterior extremity is more distended.

6. *Sphærium stamineum*, CONRAD.—Animal not observed.

Fig. 30.



S. stamineum.

Shell oval, somewhat full, inequilateral; anterior generally abrupt; posterior slightly distended; beaks very full and prominent, widely separate at the apex, often eroded; epidermis dark brownish-yellow; striæ heavy; valves strong; interior blue; hinge-margin curved; cardinal teeth double, nearly obsolete; lateral teeth distinct, strong.

Long. 0.56; Lat. 0.37; Diam. 0.31 inches.

Hab. North America, in the States of New Jersey, Ohio, Illinois, Arkansas and Alabama. (Cabinets of the Academy of Natural Sciences of Philadelphia, Smithsonian Institution, Conrad, Jay and Prime.)

Cyclas staminea, CONRAD, Amer. Journ. XXV, 1834, 342, pl. 1, f. v.

Cyclas fuscata, RAFINESQUE, Prime in Bost. Proc. IV, 1852, 281.

Cyclas bulbosa, ANTHONY, Prime in loc. sub. cit. IV, 1852, 283.

I have been induced to unite to this species the *C. fuscata*, Rafinesque, which I consider as nothing more than a large variety.

¹ Notes on some American species of *Cyclas*, &c., by Temple Prime, the Hague, 1857. 8vo.

The *C. bulbosa*, Anthony, is a little more globose than Mr. Conrad's typical specimens, but presents no important characters of difference. The shells of this species found in New Jersey and in Illinois, are larger than those from Alabama.

This species differs from most of our North American ones by its full and very prominent beaks.

7. *Sphærium rhomboideum*, SAY.—Animal, syphons reddish-yellow.

Shell subglobular, rhombic-orbicular, equilateral; anterior margin truncated; posterior slightly angular; basal nearly straight; beaks full, but not prominent; valves slight, convex towards the beaks, gradually decreasing in fulness towards the margins; interior blue; sulcations very delicate; epidermis olive-green, with often a straw-colored zone on the margins; young shell more compressed than the adult; hinge-margin nearly straight; cardinal teeth rudimentary; lateral teeth distinct, somewhat acute, not elongated.

Long. 0.50; Lat. 0.37; Diam. 0.31 inches.

Hab. North America, in the States of Vermont, Connecticut, Massachusetts, New York, Ohio, Michigan, and in Canada. (Cabinets of the Academy of Natural Sciences of Philadelphia, Smithsonian Institution, Jay, Prime, and others.)

Cyclas rhomboidea, SAY, Acad. Nat. Sci. Phil. II II, 1822, 380.

Cyclas cornea, var. 3, LAMARCK, An. s. vert. V, 1818, 558.

Cyclas elegans, C. B. ADAMS, Bost. Jour. III, 1840, 330, pl. 3, f. 11.

This, the most attractive species of *Sphærium*, is not easily confounded with any other. Up to within a few years it was usually known among collectors under the name of *C. elegans*, Adams. I have stated elsewhere¹ my reasons for considering the *C. elegans* as identical with Say's shell. Though no longer rare since 1851, when Mr. Whittemore found it in considerable abundance at one place near Cambridge, Mass., this species does not seem to be very widely distributed; it is confined to certain special localities.

Fig. 31.



S. rhomboideum.

¹ Annals of the N. Y. Lyceum, vol. vi, 1853, 66.

8. *Sphaerium dentatum*, HALDEMAN.—Animal not observed.

Fig. 32.

*S. dentatum.*

Shell large, ventricose, somewhat equilateral, inferior and anterior margins rounded; posterior somewhat angular; beaks large, well-rounded, distant, not very prominent; hinge-margin nearly straight; cardinal teeth single, distinct; lateral teeth not prominent; sulcations slight; epidermis olive-green, with a dark narrow zone at some distance above the basal margin.

Long. 0.50; Lat. 0.40; Diam. 0.37 inches.

Hab. North America, in Oregon. (Cabinet of the Academy of Natural Sciences of Philadelphia.)

Cyclas dentata, HALDEMAN, Proc. Acad. Nat. Sci. Phila. I, 1841, 100.

The young shell is more elongated and more heavily sulcated than the adult; the beaks are less large and less tumid. This is a well marked species, compared with *S. patella*, Gould, from the same section of the country, it is found to be larger, more ventricose, the beaks are more inflated, and the color of the epidermis is different.

The only two specimens I have seen of the *S. dentatum* were those from which Mr. Haldeman described the species, an adult and a young one, which he was kind enough to lend me for study; they are now deposited in the collection of the Academy of Natural Sciences of Philadelphia.

9. *Sphaerium fabalis*, PRIME.—Animal, syphons crimson.

Shell transversely oval, compressed, nearly equilateral; anterior and

Fig. 33.

*S. fabalis.*

basal margins rounded; posterior margin slightly abrupt; beaks not full, very much depressed; sulcations moderately heavy, very regular, quite distinct; epidermis light-green, it is, however, sometimes quite dark; in the young it is often straw color; valves slight, interior blue; hinge-margin very slightly curved; cardinal teeth small, assuming the shape of the letter V reversed; lateral teeth slight; anterior tooth somewhat more elevated, both placed very nearly on a line with the cardinal teeth.

Long. 0.56; Lat. 0.43; Diam. 0.25 inches.

Hab. North America, in the States of New York, Ohio, Illinois, Tennessee, Georgia, Virginia, Michigan and Pennsylvania. (Cabinets of Smithsonian Institution, Jay and Prime.)

Cyclas fabalis, PRIME, Bost. Proc. IV, 1851, 159.

Cyclas castanea, PRIME, loc. sub. cit. IV, 1851, 160.

Cyclas sulculosa, DECHARPENTIER, MSS. 1851.

This is a very distinct species; I know of no other to which it bears any resemblance; it is remarkable for its compressed appearance, and for the depression of its beaks. Though pretty widely distributed, it does not seem to be found anywhere in much abundance.

The epidermis of the shell is at times so entirely stained with a darkish substance, that it is with difficulty that its color can be detected.

10. Sphærium occidentale, PRIME.—Animal not observed.

Shell oval, small, pellucid, fragile, equilateral, margins rounded; valves slight, rather convex; beaks full, rounded, not much raised; sulcations very fine, hardly visible; epidermis horn color; cardinal teeth very diminutive; lateral teeth more distinct.

Long. 0.31; Lat. 0.25; Diam. 0.18 inches.

Hab. North America, in the States of New York, Vermont, Ohio, Michigan, Wisconsin, in the Hell Gate River, Washington Territory, and in Canada. (Cabinets of the Academy of Natural Sciences of Philadelphia, Smithsonian Institution, Jay and Prime.)

Cyclas ovalis (preoc.), PRIME, Bost. Proc. IV, 1852, 276.

Sphærium ovale, STIMPSON, ADAMS, rec. gen. II, 1858, 450.

Sphærium occidentale, PRIME, Proc. Ac. N. S. Phila. 1860, 295.

Fig. 34.



S. occidentale.

This species is remarkable for its completely oval shape, which renders it quite distinct from all others. It is found not uncommonly. Compared with *S. partumeium*, under which name it has at times been sent to me, it is much smaller, the margins are more rounded, and the beaks are not so much raised.

11. Sphærium nobile, GOULD.—Animal not observed.

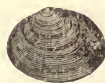
Shell rhombic-ovate, inequilateral, moderately compressed; anterior margin truncated, posterior more distended, basal curved; beaks rounded, inclined towards the front, slightly tumid, separate at apex; sulcations coarse; epidermis delicate, light brown; valves strong, interior white; hinge-margin nearly straight, moderately broad; cardinal teeth single, distinct; lateral teeth moderately developed.

Long. 0.50; Lat. 0.37; Diam. 0.25 inches.

Hab. North America, at San Pedro, in the State of California. (Cabinets of Gould, Smithsonian Institution and Prime.)

Cyclas nobilis, GOULD, Bost. Proc. V, 1855, 229. Atlas of U. S. Exp. Expedit. pl. 36.

Fig. 35.



S. nobile.

Compared with *S. sulcatum* it is slighter, less sulcated, more compressed and less tumid. This species is rare, the only specimens I have seen were kindly presented to me by Dr. Gould.

12. *Sphærium patella*, GOULD.—Animal not observed.

Shell rounded oval, lenticular, compressed, equilateral; margins generally rounded; beaks central, small, hardly raised; valves slight, interior white; sulcations extremely fine; epidermis light, of a yellowish-brown color; cardinal teeth very diminutive, so placed as to assume the shape of the letter V reversed; lateral teeth not prominent, elongated.

Fig. 36.



S. patella.

Long. 0.43; Lat. 0.31; Diam. 0.18 inches.

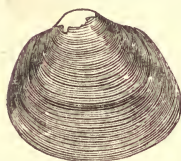
Hab. North America, in Oregon. (Cabinets of Gould, Smithsonian Institution and Prime.)

Cyclas patella, GOULD, Bost. Proc. III, 1850, 292. Atlas U. S. Exp. Expedit. pl. 36.

This species is peculiar, owing to its compressed oval shape and rounded beaks; compared with *S. flavum* it is more oval, more equilateral, and its beaks are less tumid. The specimens in my cabinet came from Dr. Gould.

13. *Sphærium vermontanum*, PRIME.—Animal not observed.

Fig. 37.



S. vermontanum.

Shell very oblique, tumid, inequilateral, full; anterior margin abrupt, posterior drawn out to an angle, basal slightly curved; beaks large, full, prominent, placed very much towards the anterior, in which direction they are slightly inclined; sulcations coarse, moderately regular; epidermis light green; ligament conspicuous; valves solid, interior light blue; hinge-margin much curved, broad; cardinal teeth strong, representing the letter V reversed; lateral teeth elongated, strong.

Long. 0.56; Lat. 0.37; Diam. 0.25 inches.

Hab. North America, in Lakes Champlain and Memphremagog, Vermont. (Cabinets of Prime and Smithsonian Institution.)

Sphærium vermontanum, PRIME, Proc. Ac. N. S. Phil. 1861, 128.

Remarkable for its very oblique and tumid shape, and for the abruptness of its anterior margin. Compared with *S. stamineum*, it is more tumid and less heavily sulcated; it is less elongated and more tumid than the *S. striatinum*. Quite rare. I have never seen but a few specimens of this species, which were received from the late Prof. Adams, of Amherst.

14. Sphærium emarginatum, PRIME.—Animal not observed.

Shell triangular, nearly equilateral, convex, tumid, anterior and posterior margins abrupt, posterior slightly more distended, basal margin curved; valves solid, interior white; beaks very full, prominent, nearly central; ligament distinct; sulcations regular, not heavy; epidermis brown, with several narrow transverse zones of a dark color at regular intervals; hinge-margin curved; cardinal teeth single, quite distinct; lateral teeth not much elongated, strong.

Long. 0.37; Lat. 0.37; Diam. 0.25 inches.

Hab. North America, in the region of Lake Superior. (Cabinets of Agassiz, Smithsonian Institution and Prime.)

Cyclas emarginata, PRIME, Bost. Proc. IV, 1851, 156.

The triangular and very tumid form of this species is quite singular; it differs from *S. vermontanum* in being more tumid, fuller, in having larger beaks, and in being much less broad at the base. The young shell is more elongated and less tumid than the adult. A rare species.

Fig. 38.

*S. emarginatum.***15. Sphærium flavum, PRIME.**—Animal not observed.

Shell transversely rounded, compressed, equilateral, delicate, margins generally rounded, the posterior a little distended; beaks central, not full, more or less depressed; valves very slight, interior whitish; sulcations pretty deep, regular; epidermis light, of a greenish-yellow color; cardinal teeth small, in the shape of the letter V reversed; lateral teeth elongated.

Long. 0.43; Lat. 0.31; Diam. 0.18 inches.

Hab. North America, at the Sault St. Marie, Lake Superior. (Cabinets of Agassiz, Smithsonian Institution, Jay and Prime.)

Cyclas flava, PRIME, Bost. Proc. IV, 1851, 155.

This is a very slight and delicate species, quite distinct from any others but *S. patella*, to which it bears some general resemblance from its shape; it is, however, more compressed, less high, and the exterior of the valves is very different, as they are nearly smooth in Dr. Gould's shell. Found not un plentifully in the one locality.

Fig. 39.

*S. flavum.*

16. Sphærium tumidum, W. BAIRD.—*S. testa ovato-trigona, tumida, olivacea, conferte transversim concentrice forte costata; umbonibus prominentibus, nec non erosio; interne cœrulescente; margine ventrali rotundato.*

Long. 0.50; Lat. 0.51 inches.

Hab. North America, at Sumass Prairie, Frazer River, British Columbia. (Cabinet of the British Museum.)

Sphærium tumidum, W. BAIRD, Proc. Zool. 1863, 69.

"This shell is of a tumid, swollen figure, and of an ovate-trigonal shape. The color externally is dark olive, and it is strongly ribbed concentrically. The beaks are prominent, and frequently eroded. The inner surface is of a bluish tint. The ventral or lower margin is rounded."

17. *Sphærium spokani*, W. BAIRD.—S. testa rotundato-ovata, cornea, concentricè transversim conferte minute striata, nitida, sub lente obsolete punctata; umbonibus rotundatis, obtusis; interne albida; margine ventrali rotundato.

Long. 0.48; Lat. 0.51 inches.

Hab. North America, in the Spokane and Kootanie Rivers, British Columbia. (Cabinet of the British Museum.)

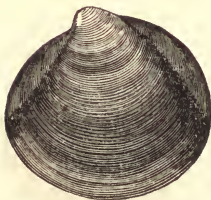
Sphærium spokani, W. BAIRD, Proc. Zool. 1863, 69.

This shell is smaller than *S. tumidum*, more rounded, and with more obtuse beaks. The striæ or riblets are much less distinct; the color is pale horny externally, and white internally. It has a shining appearance; but when examined by the lens, the surface is seen to be indistinctly punctate. The specimens taken from the Spokane River are much larger than those collected in the Kootaine.

b. BEAKS TUBERCULAR OR CALYCLULATE.

18. *Sphærium elevatum*, HALDEMAN.—Animal not observed.

Fig. 40.



S. elevatum.

Shell ovate, orbicular, nearly spherical, cavity large, equilateral, margins well rounded; beaks central, slightly inclined towards the anterior, lapping over the outline of the shell, large, tumid, approximate, calyculate, prominent; hinge-margin slightly curved; cardinal teeth united, prominent; lateral ones elongated, large; valves very strong, interior bluish; surface smooth, striation light, irregular; color brownish-olive, greatly varied by zones of a lighter shade, a zone of bright yellow bordering the inferior and part of the lateral margins.

Long. 0.56; Lat. 0.50; Diam. 0.31 inches.

Hab. North America, at New Orleans, La., and in Florida and Alabama. (Cabinets of the Academy of Natural Sciences of Philadelphia and Prime.)

Cyclas elevata, HALDEMAN, Proc. Acad. Nat. Sci. Phila. I, 1841, 53.

Cyclas pallida, DECHARPENTIER, MSS. 1851.

Remarkable for its transversely spherical shape, which renders it distinct from all other species of this genus. It is much more solid than the generality of calyculate species, the valves being as strong as those of any of the larger species of the preceding group.

C. pallida, the young of this species, is more delicate than the adult; it is a little less transversely spherical, the striæ are lighter, and the color is bright yellow.

Prof. Haldeman's original specimen of *C. elevata*, from which this description was prepared, and which is now in the cabinet of the Academy of Natural Sciences, though very perfect in appearance, comprised but a single valve.

This species seems to be very rare. I have never met with any other specimens but the one in the cabinet of the Academy and those I have in mine—two specimens of *C. pallida*, derived from DeCharpentier himself, and a single valve from Florida.

Fig. 41.



S. elevatum.

19. *Sphaerium partumeium*, SAY.—Animal usually white, in some varieties pink, syphonal tubes pink.

Shell rounded-oval, thin, fragile, pellucid, somewhat inflated, nearly equilateral; anterior margin very slightly distended, rounded; posterior slightly abrupt; basal rounded; beaks central, calyculate, approximate at apex; striæ so delicate as hardly to be visible; epidermis glossy, of a light greenish horn color, with at times a zone of a different shade on the basal margin; valves delicate, moderately convex, interior light blue; hinge-margin nearly straight, passing by a regular curve into the anterior margin, but curving suddenly behind so as to form an obtuse angle, causing the posterior side to appear broader, thus giving the shell

Fig. 42.



S. partumeium.

a somewhat rhombiform appearance; cardinal teeth strong, assuming the shape of the letter V reversed; lateral teeth very much elongated.

The young shell is more compressed than the adult; it is usually light yellow.

Long. 0.50; Lat. 0.43; Diam. 0.31 inches.

Hab. North America, in the States of New England, New York, New Jersey, Wisconsin, Pennsylvania, Ohio, Michigan, South Carolina, Georgia, Mississippi, Alabama, and Arkansas. (Cabinets of the Academy of Natural Sciences of Philadelphia, Smithsonian Institution, Boston Society of Natural History, Garden of Plants at Paris, Agassiz, Jay and Prime.)

Cyclas partumeia, SAY, Acad. Nat. Sci. Phila. Jour. II, 1822, 380.

Cyclas cornea, var. 2, LAMARCK, An. s. Vert. V, 1818, 558.

Cyclas orbicularia, BARRATT, American JI. XLVIII, 1845, 276.

Cyclas mirabilis, PRIME, Bost. Proc. IV, 1851, 157.

Cyclas cærulea, PRIME, loc. sub. cit. IV, 1851, 161.

Cyclas eburnea, ANTHONY, loc. sub. cit., IV, 1852, 279.

This species varies much according to the localities where it is found, which accounts in part for the number of names it has received. *C. orbicularia*, of which I have authentic specimens from Mr. Barrat, is a genuine *S. partumeium*, without even any local modifications of shape. *C. mirabilis*, from Georgia, is a small form of this species, and *C. cærulea* differs from the type in being a little less inflated. *C. eburnea*, from Arkansas, varies from the northern *S. partumeium* in being more compressed and a little more elevated. I do not think, however, taking the difference of localities into consideration, that these are characters sufficient to warrant retaining *C. eburnea* as a distinct species. I had an opportunity, while in Paris, to assure myself that the variety No. 2 of *C. cornea* was a true *S. partumeium*.

This species is not only very widely distributed, but where it is found, it occurs in large numbers. The only one of our northern species to which it bears much resemblance is *S. truncatum*, and that is only in general outline; the *S. partumeium* is much more inflated and transversely more broad.

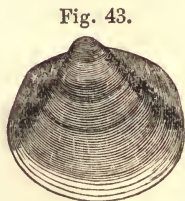
20. *Sphærium jayanum*, PRIME.—Animal not observed.

Shell rhombic, nearly equilateral, moderately convex, thin, fragile, somewhat translucent, drawn up to an angle towards the hinge-margin; anterior and posterior margins very abrupt, inferior very slightly curved; beaks central, calyculate, approximate at apex; hinge-margin considerably shorter than the basal margin, slightly curved; cardinal teeth

distinct, in the shape of the letter V reversed; lateral teeth elongated; valves delicate, interior light blue; striæ hardly visible; epidermis glossy, light greenish horn color, with at times a zone of bright yellow on the inferior margin.

Long. 0.50; Lat. 0.43; Diam. 0.18 inches.

Hab. North America, in the region of Lake Superior? Iowa and Canada. (Cabinets of Agassiz, Smithsonian Institution, Jay, Garden of Plants in Paris, and Prime.)



S. jayanum.

Cyclas jayensis, PRIME, Bost. Proc. IV, 1851, 157.

This attractive and rare species is easily distinguished by its elevated shape and by its abrupt lateral margins, which give it a somewhat triangular appearance. It is related to *S. ryckholti* of Europe, from which it differs, however, in being more inflated, its beaks are less prominent, the shell is more elevated, and its anterior margin is abrupt, whereas in *S. ryckholti* it is distended and angular.

21. Sphærium tenue, PRIME.—Animal not observed.

Shell small, transversely oblong, pellucid, moderately full, subequilateral; anterior and basal margins rounded, posterior margin subabrupt; beaks nearly central, not prominent, calyculate; striations very fine and regular, hardly perceptible; epidermis glossy, light straw color; valves slight, interior straw color; hinge-margin short, narrow, nearly straight; cardinal teeth very diminutive, lateral teeth small, elongated.

Fig. 44.



S. tenue.

Long. 0.18; Lat. 0.12; Diam. 0.06 inches.

Hab. North America, in the Androscoggin, Maine, and in the Upper Mackenzie, British America. (Cabinets of Prime and the Smithsonian Institution.)

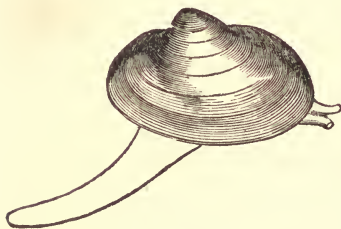
Cyclas tenuis, PRIME, Bost. Proc. IV, 1851, 161.

This species, the smallest one known to inhabit the United States, was discovered some years since by Mr. Girard, from whom I obtained my specimens. It may possibly be the young of some species, but if so, it would be very difficult to say which; setting aside its diminutive size, it appears to have all the characteristics of a mature shell. In outline it seems to be allied to *S. transversum*; it is, however, more inflated, less elongated, and its margins are more rounded. At first sight, it might readily be mistaken for a *Pisidium*.

22. *Sphærium transversum*, SAY.—Animal white, syphonal tubes pink, foot white.

Shell transversely oblong, elongated, subinequilateral, translucent; an-

Fig. 45.



S. transversum.

terior side narrow; anterior margin rounded, posterior margin subtruncate, basal very much curved; beaks placed somewhat on the anterior side, large, calyculate, very much raised above the outline of the shell; striae very delicate; epidermis greenish-yellow, of a darker shade at times on the region of beaks; valves slight, interior bluish; hinge-margin very nearly straight, narrow; cardinal teeth compressed, in the shape of the letter V reversed, and very much expanded;

lateral teeth slightly elongated.

Long. 0.62; Lat. 0.43; Diam. 0.25 inches.

Hab. North America, in the States of New York, Pennsylvania, Ohio, Kentucky, Arkansas, Alabama, and in Canada. (Cabinets of Jay, Prime and the Smithsonian Institution.)

Cyclas transversa, SAY, New Harm. Dissem. II, 1829, 356.

Cyclas detruncata, PRIME, Bost. Proc. IV, 1851, 155.

Cyclas gracile, PRIME, loc. sub. cit. IV, 1851, 156.

Cyclas constricta, ANTHONY, loc. sub. cit. IV, 1852, 274.

This large and delicate species is remarkable for its very transverse shape and for the narrowness of the anterior extremity as compared to the posterior. The form of the shell recalls that of many of the small species from the West Indies and South America. It is found in considerable abundance.

C. detruncata does not differ sufficiently from the type to constitute even a variety. *C. gracilis* is a large variety of *S. transversum*; it is a little more inflated and of a darker color. *C. constricta* is nothing more than a difformed specimen of Say's species, having a perpendicular furrow up the centre of each valve, caused by some accident occurring to the shell during its growth.

23. *Sphærium contractum*, PRIME.—Shell transversely oblong, inequilateral, translucent, moderately full; anterior side narrow; anterior margin rounded; posterior margin subtruncate; basal rounded; beaks inclined towards the anterior, calyculate, raised above the outline

of the shell; striæ very delicate; epidermis greenish-yellow, somewhat darker in the region of the beaks; valves slight, interior bluish; hinge-margin somewhat rounded, narrow; cardinal teeth slight, assuming the shape of the letter V reversed; lateral teeth elongated.

Long. 0.56; Lat. 0.34; Diam. 0.21 inches.

Hab. North America, in the Big Prairie Creek and in Greer's Creek in the State of Alabama. (Cabinets of the Smithsonian Institution, Lewis, Showalter, Wheatley, and Prime.)

Fig. 46.

*S. contractum.*

Compared with *S. transversum*, to which this species is closely allied, it is found to be smaller, less elongated, the beaks are smaller, the anterior and posterior margins less disproportionate and the hinge-margin is more rounded.

Found by Dr. Showalter, in not inconsiderable number.

24. *Sphaerium securis*, PRIME.—Animal pinkish, syphons of the same color.

Shell rhombic-orbicular, ventricose, subequilateral, both sides of very nearly the same length; anterior margin a little curved; posterior margin abrupt, forming an obtuse angle with the hinge-margin: basal margin much longer than the superior margin, rounded; beaks large, calyculate, slightly inclined towards the anterior, very approximate at apex; valves slight, very convex, especially in the region of the umbones; striæ delicate, regular, hardly perceptible; epidermis glossy in some cases, very variable in color, but generally of a greenish-horn, at times of a brilliant yellow or straw color; hinge-margin curved, narrow; cardinal teeth very small, united at base; lateral teeth slight, elongated, very narrow.

Fig. 47.

*S. securis.*

Long. 0.37; Lat. 0.31; Diam. 0.25 inches.

Hab. North America, in the States of Massachusetts, Vermont, Rhode Island, Pennsylvania, Michigan, New York, and in Canada. (Cabinets of Jay, Lewis, Prime, and Smithsonian Institution.)

Cyclas securis, PRIME, Bost. Proc. IV, 1851, 160.—Ann. N. Y. Lyceum, V, 1851, 218, pl. vi.

C. cardissa, PRIME, Bost. Proc. IV, 1851, 160.

C. crocea, LEWIS, loc. sub. cit. VI, 1854, 25.

Found plentifully at Cambridge, Mass. I cannot see differences sufficient between *S. securis* and *C. cardissa* to separate them; *C. cardissa* is more globose, transversely shorter, more elevated,

but still intermediate forms uniting the two are so frequent that it is not possible that they should form distinct species.

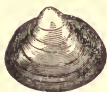
C. crocea, Lewis, is a young of this species.

Compared with *S. sphæricum*, the *S. securis* is more equilateral, the beaks are less tumid and less inclined, the sides are less rounded, and the hinge-margin is less curved.

25. *Sphærium rosaceum*, PRIME.—Animal not observed.

Shell small, rounded-oval, fragile, translucent, subequilateral, somewhat compressed, margins generally rounded; beaks nearly central, slightly inclined towards the anterior, calyculate, approximate at apex; valves very slight, a little convex in the region of the umbones; striæ regular, hardly visible; epidermis shiny, reddish-brown; hinge-margin nearly straight, delicate, narrow; cardinal teeth nearly obsolete, lateral teeth slight, elongated.

Fig. 48.



S. rosaceum.

Long. 0.25; Lat. 0.18; Diam. 0.15 inches.

Hab. North America, in the Schuylkill River. (Cabinet of Prime.)

Cyclas rosacea, PRIME, Bost. Proc. IV, 1851, 155.

This species, which is very rare, the only specimens known to me being those in my collection, is not very liable to be confounded with others. Compared with *S. occidentale*, it is less full, the beaks are more prominent and are calyculate.

26. *Sphærium sphæricum*, ANTHONY.—Animal not observed.

Fig. 49.



S. sphæricum.

Shell globose, subequilateral, transversely oval; anterior side narrow, distended, rounded; inferior margin rounded; posterior margin subabrupt; beaks inclined towards the anterior, large, prominent, calyculate; valves slight, very convex, interior blue; striæ fine and regular; epidermis greenish; hinge-margin much curved; cardinal teeth strong, united at base and disposed in the shape of the letter V reversed; lateral teeth prominent, very distinct, rather short.

Long. 0.31; Lat. 0.20; Diam. 0.18 inches.

Hab. North America, in the Black River, Ohio. (Cabinets of Anthony, Prime, and Smithsonian Institution.)

Cyclas sphærica, ANTHONY, Bost. Proc. IV, 1852, 275.

Very rare; I have seen but few specimens of this species besides those in Mr. Anthony's collection and in mine. Compared with

S. rosaceum, it is less equilateral, more inflated and the margins are less rounded.

27. *Sphærium truncatum*, LINSLEY.—Animal not observed.

Shell rhombic-orbicular, lenticular, thin, pellucid, very slightly inflated, subequilateral; anterior side narrower; anterior margin rounded; posterior margin nearly a straight line; basal somewhat curved; beaks central, calyculate, approximate at apex; striæ very delicate; epidermis glossy, light greenish horn color; valves slight, very little convex; interior light blue; hinge-margin very nearly straight; very narrow; cardinal teeth diminutive, united at base; lateral teeth slight, narrow, not much elongated.

Fig. 50.



S. truncatum.

Long. 0.37; Lat. 0.31; Diam. 0.15 inches.

Hab. North America, in the States of Maine, Vermont, Massachusetts, Connecticut, Wisconsin, New York, Ohio, and in Canada. (Cabinets of Linsley, Gould, Prime and Smithsonian Institution.)

Cyclas calyculata, C. B. ADAMS, Amer. Jour. XI, 1841, 277.

Cyclas truncata, LINSLEY, Amer. Jour. VI, 1848, 234, f. 3.

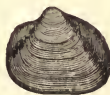
Cyclas pellucida, PRIME, Bost. Proc. IV, 1852, 277.

The specimens from which this description was prepared, the same ones from which Dr. Gould described the original *C. truncata*, are precisely similar to those the late Prof. Adams sent to me labelled *C. calyculata*, from Vermont, and which I described, in 1852, under the name of *C. pellucida*. This species is undoubtedly very closely allied to *S. lacustre*, Férussac (*C. calyculata* of authors) of Europe, but still the differences are patent enough to authorize its being retained as distinct. Compared with *S. partumeium*, the *S. truncatum* is less inflated, transversely less broad, the posterior margin is more abrupt and the hinge slighter. The young, more tumid than the adult, is of a lemon yellow. Found not uncommonly.

28. *Sphærium lenticula*, GOULD.—Animal not observed.

Shell rhombic-orbicular, lenticular, thin, pellucid, very slightly inflated, nearly equilateral; anterior side narrower; anterior margin curved; posterior margin abrupt, inferior rounded; beaks central, calyculate, approximate at apex; striæ hardly visible; epidermis glossy, light greenish horn color; valves delicate, a little convex towards the region of the umbones; interior light blue; hinge-margin nearly straight, narrow; cardinal teeth hardly visible, united at base; lateral teeth slight, narrow, not much elongated.

Fig. 51.



S. lenticula.

Long. 0.43; Lat. 0.37; Diam. 0.18 inches.

Hab. North America, in Carson and Klamath Rivers, California. (Cabinets of Gould, Anthony and Prime.)

Lucina lenticula, GOULD, Bost. Proc. III, 1850, 256.

Cyclas lenticula, GOULD, Atlas Explor. Exped. pl. 36, f. 528.

This species, of which I obtained specimens from Dr. Gould, is so similar in nearly every respect to *S. truncatum*, that it is very difficult to tell them apart. The valves of *S. lenticula* are perhaps a little more convex as they approach the region of the beaks, and the hinge-margin a little more curved and less narrow. The young shell is of the same color as the adult, whereas, with *S. truncatum*, the young is of a lighter color.

29. *Sphærium subtransversum*, PRIME.—Animal not observed.

Shell small, transversely oblong, equilateral, translucent, fragile, compressed; beaks central, large, calyculate; striæ very delicate; epidermis greenish-yellow.

Long. 0.30; Lat. 0.20; Diam. 0.10 inches.

Hab. North America, at Tabasco in Mexico. (Cabinet of Cuming.)

Sphærium subtransversum, PRIME, Proc. Zool. XXVIII, 1860, 322.

The only specimen I have seen of this species was sent to me for description by Mr. Cuming.

30. *Sphærium argentinum*, D'ORBIGNY.—Animal not observed.

Shell oval, small, translucent, compressed; anterior side short, somewhat angular, posterior side distended and truncated at the end; beaks calyculate; striæ delicate; epidermis greenish-brown; valves slight, interior bluish; cardinal teeth united, lateral teeth hardly visible.

Long. 0.31; Lat. 0.25 inches.

Hab. South America, at Montevideo at the base of the Cerro. (Cabinet of the British Museum.)

Cyclas argentina, D'ORBIGNY, Mag. de Zool. 1835.—IB. Voy. en Amer. Mérid. 1844, 568, pl. 83, f. 5-7.

It has not been my good fortune to meet with this species. M. D'Orbigny says it bears some resemblance to *C. calyculata*, meaning thereby, I presume, the shell now known to European Conchologists under the name of *S. lacustre*, Férussac.

c. SHELL ALWAYS SMALL, RHOMBOIDAL, BEAKS CALYCLULATE.

31. Sphaerium bahiense, SPIX.—Animal not observed.

Shell very small, rounded-oval, inflated, inequilateral; anterior margin narrow, curved; posterior margin broad, subtruncate; inferior margin curved; beaks inclined towards the anterior, large, prominent, calyculate; valves slight, interior dark yellow, irregularly mottled with dark reddish spots; lines of growth very fine; epidermis yellowish-brown, with irregular spots of dark purple; hinge-margin very narrow, nearly straight; cardinal teeth small; lateral teeth comparatively strong, the posterior one much the longer.

Fig. 52.



S. bahiense.

Long. 0.15; Lat. 0.12; Diam. 0.09 inches.

Hab. South America, at Bahia in Brazil. (Cabinets of Jay, Prime and others.)

Cyclas bahiensis, SPIX, Test. Braz. 1827, 32, pl. xxv, f. 5, 6.

Cyclas maculata, ANTON (non MORELET), Wieg. Archiv, 1837, 284.

Pisum maculatum, DESHAYES, Brit. Mus. Cat. 1854, 283.

Pisum bahiense, DESHAYES, loc. sub. cit. 1854, 284.

Musculium bahiense, ADAMS, Rec. Gen. II, 1858, 451.

Musculium maculatum, ADAMS, loc. sub. cit. II, 1858, 451.

This, the smallest species of *Sphaerium*, has the peculiar appearance characteristic of the West Indian and South American shells of this genus. It does not seem to be uncommon. Some authors, led away by its diminutive size, have committed the error, as may be seen by the above synonymy, of placing it under the head of *Pisidium*. I have never seen *C. maculata*, Anton (non Morelet), but have every reason to believe, from the description given of it, that it does not differ materially from this species. In outline it is somewhat similar to *S. barbadense*; it is, however, much smaller, less inflated, and the beaks are much more raised. Compared with *S. meridionale*, and *S. maculatum* of Morelet, it is smaller, more inflated, and the margins are more rounded.

32. Sphaerium barbadense, PRIME.—Animal not observed.

Shell small, rounded oval, ventricose, subequilateral, delicate; anterior side a little the shorter and narrower; margins generally rounded; beaks slightly inclined towards the anterior, nearly central, small, calyculate, approximate at apex, at times eroded; striae coarse for the size of the

Fig. 53.

*S. barbadense.*

shell, though not very distinct; epidermis dark greenish-brown; valves slight, very convex; cardinal teeth very small; lateral teeth strong, very much drawn up and shorter than they usually are in other species.

Long. 0.25; Lat. 0.20; Diam. 0.15 inches.

Hab. Barbados, West Indies. (Cabinet of Prime.)

Sphærium barbadense, PRIME, Proc. Acad. Nat. Sci. Phila. 1861, 415.

I have but one specimen of this species, which seems to be closely allied to *S. bahiense*; it is, however, much larger, more globose, and its beaks are not as much raised.

33. *Sphærium modioliforme*, ANTON.—Animal not observed.

Shell small, ovate oblong, moderately inflated, inequilateral, translucent; anterior and basal margins rounded, posterior somewhat distended and subtruncate; beaks inclined towards the anterior, prominent, calyculate; valves slight, convex; epidermis dark yellow, irregularly spotted with a darker color; striæ hardly visible; teeth very small; hinge-margin somewhat curved, very narrow.

Long. 0.31; Lat. 0.18; Diam. 0.15 inches.

Hab. South America, in Brazil and Venezuela. (Cabinets of the Academy of Natural Sciences of Philadelphia, Bourguignat, Gassies, Museum of Paris, Michaud, and Museum at Leyden.)

Cyclas modioliformis, ANTON, Wieg. Archiv, 1837, 284.

Pisidium diaphanum, HALDEMAN, Proc. Acad. Nat. Sci. Phila. I, 1841, 53.

Pisum modioliforme, DESHAYES, Brit. Mus. Cat. 1854, 283.

Pisidium moquinianum, BOURGUIGNAT, Amen. I, 1855, 61, pl. 3, f. 13-17.

Cyclas moquiniana, GASSIES, Pisid. 1855, f. 9.

Cyclas striatella, FÉRUSAC, Museum of Paris.

Cyclas littoralis, FÉRUSAC, Collect. Michaud.

Cyclas venezuelensis, PRIME, Museum of Leyden.

Musculium modioliforme, ADAMS, Rec. Gen. II, 1858, 451.

The specimen from which this description was prepared (the original shell from which Mr. Haldeman described the *P. diaphanum*) is in the Cabinet of the Academy of Natural Sciences of Philadelphia; it was discovered in the interior of a large *Ampullaria* from Brazil. I have never seen *C. modioliformis* or *P. moquinianum*, but judging from their descriptions and from the figure of the latter, I do not doubt that they belong to this species. I have had occasion to examine *C. striatella* and *C. littoralis* personally.

S. modioliforme seems to be rare. It bears some resemblance to *S. meridionale*, but it differs from it in being more inflated and the color is lighter.

34. Sphærium meridionale, PRIME.—Animal not observed.

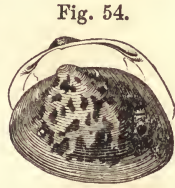
Shell small, transversely-oblong, compressed, delicate, inequilateral; anterior side narrow, shorter; anterior margin somewhat angular, posterior subabrupt, basal slightly rounded; beaks inclined towards the anterior, small, calyculate, approximate at apex; valves slight, compressed, striæ very regular and delicate, hardly perceptible; epidermis yellowish-brown, irregularly mottled with large blotches of a much darker color; hinge-margin very slightly rounded, narrow, much shorter than the basal margin; cardinal teeth diminutive; lateral teeth slight, the posterior tooth much the more elongated.

Long. 0.33; Lat. 0.20; Diam. 0.12 inches.

Hab. North America, at Panama. (Cabinets of Prime and Smithsonian Institution.)

Sphærium meridionale, PRIME, Proc. Acad. Nat. Sci. Phila. 1861, 414.

This species is easily distinguished by its very inequilateral and compressed shape. Compared with *S. maculatum*, it is larger, its posterior margin is less abrupt, and its lateral teeth are larger.



S. meridionale.

35. Sphærium maculatum, MORELET.—Animal not observed.

Shell small, transversely-oblong, rhombic, elongated, inequilateral, compressed, delicate; anterior side much the narrower, slightly rounded; posterior side very broad; posterior margin abrupt, forming a straight line from the hinge to the base of the shell; inferior margin nearly straight; valves slight, very little convex; beaks small, calyculate, inclined towards the anterior side; striæ not perceptible; epidermis dark yellowish-brown, irregularly mottled with spots of a much darker color; hinge-margin nearly straight; cardinal teeth very small; lateral teeth strong, elongated.

Long. 0.25; Lat. 0.18; Diam. 0.12 inches.

Hab. North America, in Yucatan. (Cabinets of Morelet, Jay, Prime and Smithsonian Institution.)

Cyclas maculata, MORELET, Test. nov. Insul. Cub. etc. 1851, 25, pt. 2d.

A rare species; the only specimens I have met with were



S. maculatum.

kindly presented to me by the original describer. It is easily distinguished from all other species of *Sphærium* by the very great disproportion which exists between the lateral margins.

36. *Sphærium veatleyi*, C. B. ADAMS.—Animal not observed.

Shell small, transversely elongated, inequilateral, compressed; anterior and inferior margins rounded; posterior margin subtruncate; beaks situated towards the anterior side and inclined in that direction, small, prominent, calyculate; valves slight, interior irregularly spotted with dark blotches; striæ regular, coarse for the size of the shell; epidermis horn color with a tinge of brown; hinge-margin nearly straight; cardinal teeth small but distinct, placed in the shape of the letter V reversed; lateral teeth well developed,



elongated.

Long. 0.18; Lat. 0.12; Diam. 0.06 inches.

Hab. North America, in the Island of Jamaica. (Cabinets of Jay and Prime.)

Cyclas veatleyi, C. B. ADAMS, Contrib. Conch. 1849, 44.

Pisidium veatleyi, PETIT, Journ. Conch. II, 1851, 421.

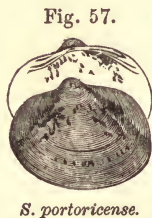
Pisum veatleyi, DESHAYES, Brit. Mus. Cat. 1854, 283.

Musculium veatleyi, ADAMS, Rec. Gen. II, 1858, 452.

This rare species, of which I received specimens from the late Prof. Adams, is somewhat allied to *S. portoricense*; it is, however, smaller, more delicate, more elongated, the valves are less, the beaks less large, and the hinge is more slight.

37. *Sphærium portoricense*, PRIME.—Animal not observed.

Shell small, transversely elongated, rhombic, equilateral, slightly compressed; margins generally straight, in especial the posterior margin; beaks central, slightly inclined towards the anterior side, calyculate, approximate at apex; striæ regular, quite heavy with respect to the size of the shell; epidermis light brownish-yellow; cardinal teeth strong; lateral teeth strong, short; valves solid, very little convex; the interior, and at times the exterior, irregularly spotted with a few dots of very dark color.



Long. 0.25; Lat. 0.20; Diam. 0.12 inches.

Hab. Portorico, West Indies. (Cabinets of Swift and Prime.)

Sphærium portoricense, PRIME, Proc. Acad. Nat. Sci. Phila. 1861, 415.

The specimens from which this description was prepared were kindly furnished to me by Mr. Swift, of St. Thomas. In proportion to its size this species is quite robust. It is different from the generality of the West Indian and South American *Sphæria*, by its sulcations, which are regular and deep. In shape and appearance it recalls the young of *S. sulcatum*. It is allied to *S. veatleyi* in outline, but otherwise it differs, being heavier and of a larger size.

38. *Sphærium parvulum*, PRIME.—Animal not observed.

Shell small, transversely-oblong, inequilateral, moderately compressed; beaks calyculate, prominent; anterior side narrower, rounded; posterior subtruncate; striæ very delicate; epidermis greenish-gray; teeth slight, but well marked.

Long. 0.15; Lat. 0.11; Diam. 0.06 inches.

" 3 $\frac{3}{4}$; " 2 $\frac{3}{4}$; " 1 $\frac{1}{2}$ mill.

Hab. At Hamacao in the Island of Portorico, West Indies. (Cabinets of Smithsonian Institution, Morelet and Prime.)

In outline this species offers some resemblance to *S. bahiense*, it is, however, much less inflated.

39. *Sphærium viridante*, MORELET.—Animal not observed.

Shell small, transversely-oblong, compressed, delicate, inequilateral; anterior side somewhat narrow, shorter, rounded; posterior subabrupt; basal margin slightly rounded; beaks inclined towards the anterior, very small, calyculate, approximate at apex; valves slightly compressed; striæ very regular and delicate; epidermis greenish-brown, irregularly mottled with large blotches of a darker color; hinge margin nearly straight; cardinal teeth diminutive; lateral teeth slight, posterior tooth longer.

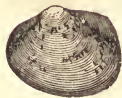
Long. 0.24; Lat. 0.18; Diam. 0.13 inches.

" 6 $\frac{1}{2}$; " 4 $\frac{1}{2}$; " 3 $\frac{1}{4}$ mill.

Hab. At Pointe-à-Pitre in the Island of Guadeloupe, West Indies. (Cabinets of Smithsonian Institution, Morelet and Prime.)

The specimens from which this description was prepared were obtained from the author. This species is very closely allied to *S. meridionale*; it differs, however, in being transversely less long, less produced at the posterior; it is also less compressed. Found not un plentifully.

Fig. 58.



S. parvulum.

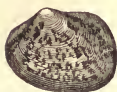
Fig. 59.



S. viridante.

40. *Sphærium cubense*, PRIME.—Animal not observed.

Fig. 60.

*S. cubense.*

Shell small, transversely-oblong, very inequilateral, compressed; anterior side shorter, narrower, rounded; posterior broad, subtruncate; inferior margin very much curved; beaks small, not much raised; striæ barely visible, epidermis brownish-yellow with spots of a darker color.

Long. 0.16; Lat. 0.10; Diam. 0.09 inches.

“ 4; “ $2\frac{1}{2}$; “ $2\frac{1}{4}$ mill.

Hab. Sta. Catalina de Guantanamo, Punta de la Jaula and Esperanza, Cuba, West Indies (*vide* Wright). (Cabinets of Smithsonian Institution, Wright, Morelet, Wheatley, and Prime.)

Compared with *S. viridante*, this species is much smaller and more compressed.

FOSSIL SPECIES.

41. *Sphærium recticardinale*, MEEK and HAYDEN.—“Shell of medium size, transversely subelliptical, rather compressed, very thin; anterior side rounded; base forming a regular semielliptic curve; posterior extremity obliquely subtruncate above and rather narrowly rounded below; cardinal margin long and straight; beaks very small, compressed and projecting but slightly above the hinge, located nearly half way between the middle and the anterior end; surface marked by moderately distinct, irregular lines of growth.”

Long. 0.55; Lat. 0.36; Diam. 0.24 inches.

Hab. Near the mouth of Grand River, on the Upper Missouri, Nebraska, United States of America. Tertiary formation. (Cabinet of Smithsonian Institution.)

Sphærium recticardinale, MEEK and HAYDEN, Proc. Acad. Nat. Sci. Phila. 1860, 176.

42. *Sphærium planum*, MEEK and HAYDEN.—“Shell rather small, broad oval or subcircular, much compressed; extremities more or less regularly rounded, the posterior margin being sometimes faintly subtruncate; base semioval in outline; cardinal margin rounding gradually from near the middle; beaks very small, compressed, and scarcely extending beyond the hinge-margin, nearly central; surface marked by fine, irregular, obscure concentric striæ.”

Long. 0.38; Lat. 0.32; Diam. 0.08 inches.

Hab. Near the mouth of Grand River, on the Upper Missouri, Nebraska, United States of America. Tertiary formation. (Cabinet of Smithsonian Institution.)

Sphærium planum, MEEK and HAYDEN, Proc. Acad. Nat. Sci. Phila. 1860, 175.

43. Sphærium formosum, MEEK and HAYDEN.—“Shell small, oval, oblique, scarcely ventricose; cardinal margin straight; buccal end rounded; anal extremity obliquely truncate; basal margin semielliptical or broadly rounded; beaks obtuse, tumid, rising somewhat above the hinge, nearly touching, placed a little in advance of the middle; surface ornamented by very fine, regular, distinct, concentric wrinkles.”

Long. 0.17; Lat. 0.08; Diam. 0.14 inches.

Hab. Three miles above Fort Union, Nebraska, United States of America. Tertiary formation. (Cabinet of Smithsonian Institution.)

Cyclas formosa, MEEK and HAYDEN, Proc. Acad. Nat. Sci. Phila. 1856, 115.

Cyclas fragilis, MEEK and HAYDEN, loc. sub. cit. 1856, 115.

Sphærium formosum, MEEK and HAYDEN, ib. May, 1860, 185.

44. Sphærium subellipticum, MEEK and HAYDEN.—“Shell small, elliptical-ovate, somewhat ventricose, thin and fragile; posterior end narrower than the anterior, both narrowly rounded; base semielliptical or semiovate; cardinal border apparently rounding gradually to both extremities; beaks not much elevated, pointed, incurved, not oblique, located near the middle; surface indistinctly marked with lines of growth.”

Long. 0.24; Lat. 0.14 inches.

Hab. Three miles above Fort Union, Nebraska, United States of America. Tertiary formation. (Cabinet of Smithsonian Institution.)

Cyclas subelliptica, MEEK and HAYDEN, Proc. Acad. Nat. Sci. Phila. 1856, 115.

Sphærium subellipticum, MEEK and HAYDEN, ib. May, 1860, 185.

“The beaks are so near the middle, and curved so nearly at right angles to the longitudinal diameter of the shell, that it is not easy to determine, especially from the examination of mutilated specimens, which is the posterior or which the anterior end. As we have only seen imperfect specimens, we are not sure the surface markings are indistinct on unworn shells.”—M. & H.

PISIDIUM, PFEIFFER.¹

Pectunculus, LIST. 1685.—*Musculus*, GAULT. 1742.—*Tellina*, MÜLLER, 1774.—*Sphærium*, SCOP. 1777.—*Cardium*, POLI, 1791.—*Cyclas*, LAMK. 1818.—*Pera*, *Euglesia*, *Cordula*, LEACH, 1820.—*Physemoda*, RAF. 1820.—*Pisidium*, PF. 1821.—*Gallileja*, DA COSTA, 1839.—*Pisum*, GRAY (non MEGERLE), 1847.—*Musculium*, GRAY (non LINK), 1851.

Animal elongate-oval, compressed laterally; lobes of the mantle without tentacles, united posteriorly into a single, short

¹ Pfeiffer, Deutsch. moll. 1821.

syphonal tube; oral aperture small, tentacles of the mouth triangular, elongated; gills of medium size; foot small, tongue-shaped, capable of great extension.

Shell small, rounded-oval, inequilateral, anterior side longer; beaks terminal; cardinal teeth double, at times united, situated immediately under the beaks; lateral teeth elongated, lamelli-form, double in the right valve, single in the left valve; ligament always on the shorter side.

This genus was instituted by Pfeiffer for a class of shells which, by the older authors, had been confounded with *Tellina*, and more recently with *Sphærium*. The differences which exist between *Pisidium* and *Sphærium*, which led Pfeiffer to establish this new genus, are very material, both in the animal and in the shell. The animal of *Pisidium* has the lobes of the mantle united posteriorly into one syphonal tube; whereas in *Sphærium*, the lobes form a tube, single at its base, but double at the extremity. According to M. Deshayes there is much difference in the formation of the foot of *Pisidium* from that of *Sphærium*—that of the former being somewhat similar to that of *Cardium*. This organ is capable of great extension, and when prolonged to its utmost extent, is not unlike that of *Lucina*; it is made use of much in the same manner as that of *Sphærium*, either to burrow into the ground or to crawl on solid bodies.

With regard to the shell, the main difference consists in the position of the beaks. In *Pisidium* the beaks are terminal, that is, the distance from the beaks to the anterior extremity is greater than the distance from the beaks to the posterior extremity. In *Sphærium*, on the contrary, the position of the beaks is generally central, dividing the hinge-margin into equal portions. The formation of the hinge of *Pisidium* is very similar to that of *Sphærium*; the position of the cardinal teeth, however, in *Pisidium* is terminal, like that of the beaks, whereas in *Sphærium* it is central. The teeth of *Pisidium* are, in proportion to the size of the shell, more robust than in *Sphærium*.

The habits and mode of living of the species of these two genera are very much the same. They are found buried an inch or more in the mud under water, or else attached to the roots or stems of aquatic plants.

Their mode of breeding is much the same, both ejecting the young when sufficiently mature, which up to that time they carry between the folds of the gills. Pfeiffer supposes the *Pisidium* to breed by throwing out eggs, but I have myself found young in the shells of *Pisidium*.

The most appropriate time of the year for collecting *Pisidium*, in the North, would seem to be from the middle of April to the early part of July—the season during which they breed; some species, however, such as *P. variabile*, I have found at all seasons, even in winter; others, such as *P. ventricosum*, are seldom found but in the early summer. Live specimens may be preserved for examination, for some time, if the water is kept sufficiently fresh. On the application of water, slightly warmed, they exhibit great activity, extending their syphonal tube and foot. They not only crawl on the sides of the vessel, in which they are confined, but also on the under surface of the water. They are very similar in some of their movements to certain species of fluviatile *Gasteropods*.

While this genus has of late years been generally adopted by the Conchologists of Europe, and more recently by those of this country, some English authors have committed the error of applying to it the names of *Pisum* and *Musculium*—a great carelessness on their part, as the types of these two genera, as set out by their respective describers, Megerle and Link, are genuine *Sphæria*.

The genus *Pisidium* is very abundantly distributed over both sections of this continent; and while the species of America are entirely distinct as such from those found elsewhere, their forms present, in nearly every instance, great analogies with those of the species of Europe and of Asia.

1. *Pisidium virginicum*, BOURGUIGNAT.—Shell large, thick, oblique, very inequilateral; anterior side longer, narrower, rounded; posterior broader, subtruncate at end, basal margin rounded; beaks situated posteriorly, large, prominent; valves solid, moderately convex, interior light blue; striae coarse and irregular; epidermis greenish-brown or chestnut color, with zones; hinge-margin very much curved; hinge broad, two strong cardinal teeth, disposed in the shape of the letter V reversed; lateral teeth strong, short.

Long. 0.35; Lat. 0.29; Diam. 0.21 inches.

Fig. 61.



P. virginicum.

Hab. North America, in New England, in the States of New York, New Jersey, Pennsylvania, Ohio, Wisconsin, Michigan, Maryland and Virginia, and in the St. Charles River at Quebec in Canada. (Cabinets of the Boston Society, the Academy of Natural Sciences of Philadelphia, Smithsonian Institution, Jay, Prime, and others.)

Tellina virginica, GML., 1788, 3236, pl. clix, f. 15.

Tellina pusilla (pars), DILLW. II, 1817, 106.

Cyclas dubia, SAY, Nich. Encycl. 3d ed. 1819, f. 4, pl. i, f. x.

Physemoda æqualis, RAFINESQUE, Ann. Gen. Sci. Phy. V, 1820, 319.

Pisidium abruptum, HALDEMAN, Proc. Acad. Nat. Sci. Phila. I, 1841, 53.

Pisidium dubium, HALDEMAN, loc. sub. cit. I, 1841, 103.

Pisidium æquale, RAFINESQUE, Prime in Bost. Jour. VI, 1852, 367.

Pisidium virginicum, BOURGUIGNAT, Amer. Malac. I, 1853, 53.

Sphærium dubium, DESHAYES, Biv. Brit. Mus. 1854, 266.

Pisum virginicum, DESHAYES, loc. sub. cit. 1854, 281.

Pisum abruptum, DESHAYES, loc. sub. cit. 1854, 281.

Pisum dubium, DESHAYES, loc. sub. cit. 1854, 282.

Musculium dubium, ADAMS, Rec. Gen. II, 1858, 451.

Musculium abruptum, ADAMS, loc. sub. cit. II, 1858, 451.

Musculium virginicum, ADAMS, loc. sub. cit. II, 1858, 452.

This, the largest species of the genus found in America, is not easily confounded with any other—its size, and general robust and coarse appearance, rendering it at once distinct. The young shell is more elongated and less full than the adult, and of a lighter color. Found not un plentifully in running waters.

Compared with *P. adamsi*, to which it bears some resemblance in outline, it is larger, more robust, more produced on the anterior side, less full, the beaks are larger, the markings on the surface are heavier, and the color is darker.

Its foreign analogue is *P. amnicum*, of Europe, to which it is very closely allied; it differs, however, in being somewhat smaller and more oblique.

Fig. 62.



P. virginicum.

2. *Pisidium adamsi*, PRIME.¹—Shell subovate, full, oblique, inequilateral; anterior side a little longer, narrower, slightly produced at end; posterior side broader, somewhat subtruncate at end, basal margin rounded; beaks small, a little raised, approximate at apex; surface smooth, striae very delicate; color light gray, interior whitish; hinge-margin curved; cardinal teeth very small; lateral teeth very distinct.

Long. 0.3; Lat. 0.24; Diam. 0.2 inches.

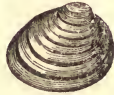
Hab. North America, at Norway in the State of Maine, and at Holly, Oakland Co., Michigan. (Cabinets of the Boston Society, Smithsonian Institution, and Prime.)

Cyclas nitida, MIGHELS (non HANLEY), Bost. Proc. I, 1841, 48.

Pisidium adamsi, PRIME, Stimp. Moll. New Engl. 1851, 16.

Sphærium nitidum, DESHAYES, Biv. Brit. Mus. Cat. 1854, 271.

Fig. 63.



P. adamsi.

A rare species. I have never seen any specimens but those in the collection of the Boston Society and those in my own, all of which came from Professor Adams, who discovered it with Dr. Mighels. The young is elliptical, obliquely striate and compressed. The so-called *Cyclas nitida*, from Connecticut and New Hampshire, is *P. variabile*.

Compared with *P. variabile*, this species is larger, comparatively more delicate, less oblique, less heavily striated, of a lighter color. It is much more oblique and less elongated than *P. abditum*. It is more oblique, and more inflated than *P. virginicum*; it is also more delicate than that species.

Fig. 64.



P. adamsi.

3. *Pisidium æquilaterale*, PRIME.—Shell small, stout, heavy, somewhat inflated, rhomboidal, subequilateral; posterior margin a little

¹ Not to be confounded with *Pisum adamsi* of DESHAYES, Biv. Brit. Mus. 1854, 284, which is the *P. jamaicense*, PRIME.

angular where it meets the basal margin; inferior and anterior margins slightly rounded; beaks central, large, prominent, rounded, not approximate; valves very solid, moderately convex, interior light blue; striæ fine, surface glossy, epidermis very variable in color, light yellow, greenish or brown; hinge-margin curved, cardinal teeth small, lateral teeth strong, distinct.

Fig. 65.

*P. æquilaterale.*

Long. 0.15; Lat. 0.14; Diam. 0.10 inches.

Hab. North America, in the States of Maine, Massachusetts and New York. (Cabinets of the Boston Society, Smithsonian Institution, Lewis, Jay, and Prime.)

Pisidium æquilaterale, PRIME, Bost. Jour. VI, 1852, 366, pl. xii, f. 23-25.

This species is remarkable for its solidity and for its short and quadrangular form, the latter gives it somewhat the appearance of a *Sphærium*; it is the most equilateral *Pisidium* I know of.

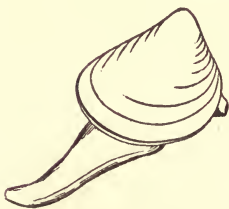
Compared with *P. variable*, to which at first sight it bears a general resemblance from the gloss and color of its epidermis, it differs very materially in not being at all oblique, and in being equilateral; it is also much less full. Somewhat rare. I discovered it in the spring of 1852, in a clay pit in the neighborhood of Augusta, Maine, in company with *P. compressum*.

Fig. 66.

*P. æquilaterale.*

4. *Pisidium compressum*, PRIME.—Shell solid, very oblique,

Fig. 67.

*P. compressum.*

trigonal, triangular, subequilateral, very much drawn up in the region of the beaks, inflated in adult; anterior side a little longer, narrower, produced at the end, posterior broader, subtruncate; beaks placed a little posteriorly, small, raised, with a wing-shaped appendage on the summits, distant; striæ distinct, regular; epidermis very variable, yellow, gray or chestnut color; valves solid, varying in inflation, interior light blue; hinge thick; cardinal teeth small, robust, compressed, disposed in the shape of the letter V reversed; lateral

teeth distinct, short, strong, placed at an obtuse angle with the hinge proper.

Long. 0.16 ; Lat. 0.14 ; Diam. 0.09 inches.

Hab. North America, in New England, in the States of New York, Pennsylvania, Ohio, and California, and at Montreal and Quebec in Canada. (Cabinets of the Boston Society, Smithsonian Institution, Jay, Prime, and others.)

Cyclas altilis, ANTHONY, in litt., 1847.

Pisidium compressum, PRIME, Bost. Proc. IV, 1851, 164.

Pisidium altile, ANTH. Prime, Bost. Jour. VI, 1852, 353, pl. xi, f. 10-12.

Pisidium cicer, PRIME, Ann. N. Y. Lyc. VI, 1853, 65, pl. i, f. 1.

Pisum compressum, DESHAYES, Biv. Brit. Mus. 1854, 282.

Pisum altile, DESHAYES, loc. sub. cit. 1854, 280.

Musculium compressum, ADAMS, Rec. Gen. II, 1858, 451.

Musculium altile, ADAMS, loc. sub. cit. II, 1858, 451.

Musculium cicer, ADAMS, loc. sub. cit. II, 1858, 451.

Pisum cicer, ADAMS, loc. sub. cit. II, 1858, 660.

This species, though perfectly distinct and well characterized, is subject to much variation ; its very oblique shape is constant ; in fulness it is exposed to much change, some old specimens are remarkably obese ; the young are generally more elongated and more compressed.

One of the peculiarities of this species, which, however, is at times wanting, from abrasion or from other causes, is the very singular shape of the apex of the beaks, which assume the appearance of wings placed on the summit of the umbos.

P. cicer, from Greenwich, which I place with this species, differs a little from the type of *P. compressum*, in being larger, more inflated ; the beaks also are larger, and do not exhibit the winged appendage. *P. altile*, a mere variety, is more oblique than the type, and does not possess the appendage on the beaks. Both these varieties are darker in color than the true *P. compressum*.

The foreign analogue, *P. conicum*, from France, is so closely allied to our species that it is with the greatest care only that they may be separated.

P. compressum is more trigonal and less inflated than *P. variabile* ; it is more equilateral than either *P. virginicum*, *adamsi*, or *abditum*, and more oblique and less equilateral than *P. æquilaterale*.

The animal is remarkable for its liveliness. It is found sparingly

during the spring, and not at all in winter. It inhabits both running and still water, and buries itself somewhat in the mud.

Fig. 68.

*P. compressum.*

5. *Pisidium variable*, PRIME.—Shell heavy, oblique, inequilateral, inflated; anterior side longer, narrower, somewhat angular at end; posterior subtruncate; beaks situated posteriorly, full, prominent, not approximate at apex; valves solid, interior light blue; striae regular, but very distinct; epidermis glossy, very variable, straw color or greenish-brown with a yellow zone on the basal margin; hinge-margin curved; hinge rather slight; cardinal teeth united, small; lateral teeth distinct, strong, short.

Fig. 69.

*P. variable.*

Long. 0.21; Lat. 0.18; Diam. 0.17 inches.

Hab. North America, in New England, and in the States of New York, Pennsylvania, and Virginia. (Cabinets of Jay, Smithsonian Institution, Prime, and others.)

Cyclas nitida, MIGHELS, Linsley, Amer. Jour. XLVIII, 1845, 276.

Pisidium variable, PRIME, Bost. Proc. IV, 1851, 163.

Pisidium grande, WHITTEMORE, in litt. 1855.

Musculium variable, ADAMS, Rec. Gen. II, 1858, 452.

Pisum variable, ADAMS, loc. sub. cit. II, 1858, 660.

This species has hitherto always been looked upon by collectors as the *P. virginicum*; but having compared it with the original shells, described as *Cyclas dubia*, Say, by Dr. Gould, in his Report, and with some specimens of *P. virginicum* from Westfield, Mass., sent to me by Prof. C. B. Adams, as well as with some others sent to me from Philadelphia, by Prof. S. S. Haldeman, I have become convinced that it is different from Say's shell. Compared with the young of *P. virginicum*, it is more oblique, less elongated, more inflated, and of a different color. This species is not so elongated as the *P. virginicum*; it is more inflated, the beaks are larger and more tumid, it is also a much

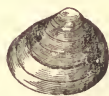
smaller shell. Say describes *Cyclas dubia* as being six-twentieths of an inch in length; *P. variable* is only four-twentieths of an inch in length, and that it is a full grown shell, I am led to believe not only from its heavy striations and mature appearance in general, but also from having found young in the shell. The young is not so oblique as the adult, it is more elongated, less inflated, and of a light yellow color. As a general rule, the coloring of this species varies much in different localities. The specimens collected from Rowley, Essex County, Mass., are larger than any I have seen from other places; their color is also lighter. The animal is remarkable for its want of activity. This is one of our most common species, being found in nearly every stream, and at all seasons of the year, though most plentifully during the spring.

Fig. 70.

*P. variable.*

6. *Pisidium nov-eboracense*, PRIME.—Shell rounded-oval, very inequilateral, inflated, margins rounded; anterior side considerably produced, narrower; beaks situated posteriorly, large, full, prominent; valves comparatively slight, interior light blue; striæ irregular; epidermis variable, generally greenish-yellow or brown; hinge-margin a little curved; hinge slight, narrow; cardinal teeth double, very small; lateral teeth elongated.

Fig. 71.

*P. nov-eboracense.*

Long. 0.35; Lat. 0.18; Diam. 0.13 inches.

Hab. North America, in the State of New York. (Cabinets of Smithsonian Institution, Lewis, Jay, and Prime.)

Pisidium nov-eboracense, PRIME, Ann. N. Y. Lyc. VI, 1853, 66, pl. i, f. 3.

Pisidium amplum, INGALLS in litt. 1855.

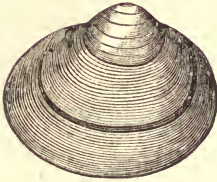
Musculium nov-eboracense, ADAMS, Rec. Gen. II, 1858, 451.

Pisum nov-eboracense, ADAMS, loc. sub. cit. II, 1858, 660.

This species, for its size, is comparatively delicate. It seems to be intermediate between *P. abditum* and *P. variable*; it is less elongated and more tumid than the former, and less oblique and more elongated than the latter. Found only in two places, at Greenwich and at Mohawk, in the State of New York.

7. *Pisidium abditum*, HALDEMAN.—Shell rounded-oval, elongated, very inequilateral, moderately convex,

Fig. 72.



P. abditum.

margins well rounded, beaks placed nearer the posterior side, small, slightly raised; surface smooth, striæ not distinct, epidermis variable, generally light straw color; hinge-margin very nearly straight; cardinal teeth small, separate, the anterior tooth larger and more prominent; lateral teeth small, not much elongated.

Long. 0.15; Lat. 0.14; Diam. 0.09 inches.

Hab. North America, in New England, in the States of New York, New Jersey, Pennsylvania, Ohio, Michigan, South Carolina and California, in the Lake Superior region, at Montreal in Canada, and in Honduras. (Cabinets of Jay, Cuming, Prime, Smithsonian Institution, and others.)

Pisidium abditum, HALDEMAN, Proc. Acad. Nat. Sci. Phila. I, 1841, 53.

Cyclas minor, C. B. ADAMS, Bost. Proc. I, 1841, 48.

Pisidium tenellum, GOULD, Agassiz, Lake Super. 1848, 245.

Pisidium obscurum, PRIME, Bost. Proc. IV, 1851, 161.

Pisidium rubellum, PRIME, loc. sub. cit. IV, 1851, 163.

Pisidium minus, STIMPSON, Moll. New Engl. 1851, 16.

Pisidium kurtzi, PRIME, Bost. Proc. IV, 1851, 162.

Pisidium zonatum, PRIME, loc. sub. cit. IV, 1851, 162.

Pisidium regulare, PRIME, Bost. Jour. VI, 1852, 363, pl. xii, f. 11, 12.

Pisidium notatum, PRIME, loc. sub. cit. VI, 1852, 365, pl. xii, f. 20-22.

Pisidium arcuatum, PRIME, loc. sub. cit. VI, 1852, 364, pl. xii, f. 14-16.

Pisum abditum, DESHAYES, Brit. Mus. Cat. 1854, 282.

Pisum minus, DESHAYES, loc. sub. cit. 1854, 281.

Pisidium resartum, INGALLS, in litt. 1855.

Pisidium rubrum, LEWIS, in litt. 1855.

Pisidium plenum, LEWIS, in litt. 1855.

Musculium abditum, ADAMS, Rec. Gen. II, 1858, 451.

Musculium minus, ADAMS, loc. sub. cit. II, 1858, 451.

Musculium rubellum, ADAMS, loc. sub. cit. II, 1858, 452.

Musculium obscurum, ADAMS, loc. sub. cit. II, 1858, 452.

Musculium kurtzi, ADAMS, loc. sub. cit. II, 1858, 451.

Musculium zonatum, ADAMS, loc. sub. cit. II, 1858, 452.

Pisum obscurum, ADAMS, loc. sub. cit. II, 1858, 660.

Pisum kurtzi, ADAMS, loc. sub. cit. II, 1858, 660.

Pisum rubellum, ADAMS, loc. sub. cit. II, 1858, 660.

Pisum zonatum, ADAMS, loc. sub. cit. II, 1858, 660.

Pisidium retusum, PRIME, Proc. Zool. XXVIII, 1860, 322.

This species is distributed over such a vast area of country, and varies so much according to the different localities in which it is found, that it is hardly surprising that its numerous varieties

should have been mistaken for so many species. *P. casertanum*, its foreign analogue, to which it bears the closest resemblance, and from which it is very difficult to separate it, is likewise widely distributed and subject to much variation.

P. abditum is our most common species, and occurs generally in great numbers; its epidermis, though usually light yellow, is at times, according to the habitat of the shell, of a much darker color; the surface is at times also quite rough and the striæ coarse.

Compared with *P. nov-eboracense*, to which it is nearly allied, it differs in being less heavy, more rounded, less full, the beaks are less large, the hinge-margin is straighter, the anterior extremity, which in the *P. nov-eboracense* forms a declivity from the beaks, is more regularly rounded, the distance from the beaks to the basal margin is less great, the exterior surface is much smoother, and the epidermis of a lighter color.

Fig. 73.



P. abditum.

8. *Pisidium simile*, PRIME.—Shell rounded-oval, very much elongated, very inequilateral, slightly compressed; anterior side rounded, posterior subabrupt; beaks moderately full, raised; surface smooth, epidermis light straw color; hinge-margin nearly straight.

Long. 0.14; Lat. 0.13; Diam. 0.07 inches.

Hab. At Guadeloupe, in the West Indies. (Cabinets of Smithsonian Institution, Morelet, and Prime.)

Fig. 74.



P. simile.

This species bears the greatest resemblance to *P. abditum* in outline and size; it is, however, a little more elongated, and more compressed.

9. *Pisidium chilense*, DESHAYES.—Shell small, delicate, moderately inflated, elongated, inequilateral; anterior side a little longer, angular at end, posterior subtruncate; beaks large, full, somewhat raised; striæ very fine, surface smooth; epidermis light yellow; hinge-margin nearly straight; cardinal teeth small, but distinct; lateral teeth a little elongated.

Fig. 75.



P. chilense.

Hab. South America, at Valparaiso, and at Coquimbo in Chili. (Cabinets of Smithsonian Institution, Cuming, and Prime.)

Cyclas chilensis, D'ORBIGNY, Voy. en Amér. 1846, 568, pl. 83, f. 11-13.

Pisidium chilense, DESHAYES, Biv. Brit. Mus. 1854, 284.

Pera chilensis, GRAY, Brit. Mus. Shells of S. Amer. 1854, 69.

Pisum chilense, DESHAYES, Biv. Brit. Mus. 1854, 284.

Musculium chilense, ADAMS, Rec. Gen. II, 1858, 451.

Corbicula chilensis, PRIME, Proc. Acad. Nat. Sci. Phila. 1860, 269.

Pisidium angulatum, PRIME, Proc. Zool. XXVIII, 1860, 322.

I have not seen any original specimens of this species; but from the description and figure given of it by M. D'Orbigny, I have no doubt that it is the same shell I described as new from the collection of Mr. Cuming, under the name of *P. angulatum*.

Compared with *P. additum*, to which it bears a general resemblance, it is smaller, a little more full, less elongated, and less rounded laterally.

10. *Pisidium jamaicense*, PRIME.—Shell small, oval, short, subequilateral, somewhat compressed; anterior side very

Fig. 76. little longer, somewhat narrower, tapering to a well-rounded extremity; posterior subtruncate; beaks small, not prominent; striæ not perceptible, surface smooth, epidermis light straw color; cardinal teeth small, lateral teeth moderately developed.



P. jamaicense.

Long. 0.083; Lat. 0.075; Diam. 0.05 inches.

Hab. Jamaica, in the West Indies. (Cabinet of Prime.)

Cyclas pygmea, C. B. ADAMS, Contrib. Conch. 1849, 44.

Pisum adamsi,¹ DESHAYES, Biv. Brit. Mus. 1854, 284.

Musculium pygmeum, ADAMS, Rec. Gen. II, 1858, 452.

Pisum pygmeum, ADAMS, loc. sub. cit. II, 1858, 660.

A rare species. The only specimens I have seen are those in my cabinet, which I received some years since from the late Professor Adams. Remarkable for its short, compact appearance.

11. *Pisidium pulchellum*, DESHAYES.²—*P.* testa ovata, inflata, tenui, sublævigata, epidermide viridescente, inæquilateralis; latere antico elongato, rotundato; latere postico brevi, obtuso; intus albicante.

Hab. South America, at Maldonado in Uruguay.

¹ Not to be confounded with *Pisidium adamsi*, PRIME (*Cyclas nitida*, MIGHELS), from Maine.

² Not to be confounded with *Cyclas pulchella*, HANLEY, or *Pisidium pulchellum*, JENYNS, a variety of *P. casertanum*, POLI.

Cyclas pulchella,¹ D'ORBIGNY, Guer. Mag. Zool. 1835.

Pisidium pulchellum, DESHAYES, Biv. Brit. Mus. 1854, 283.

Pisum pulchellum, DESHAYES, Biv. Brit. Mus. 1854, 283.

Musculium pulchellum, ADAMS, Rec. Gen. II, 1858, 452.

Sphærium pulchellum, PRIME, Proc. Acad. Nat. Sci. Phila. 1860, 297.

It has not been my good fortune to meet with this species, which M. D'Orbigny likens to *P. fontinale*, of France; he found it in considerable abundance.

12. *Pisidium ferrugineum*,² PRIME.—Shell small, rounded-oval, globose, slightly inequilateral; anterior side somewhat produced; margins rounded; beaks tubercular at apex, very distant; surface smooth; epidermis light yellow; hinge-margin rounded; cardinal teeth large, separate, anterior tooth more prominent; lateral teeth distinct.

Long. 0.17; Lat. 0.13; Diam. 0.11 inches.

Hab. North America, in the States of Maine and New York. (Cabinets of the Boston Society, Smithsonian Institution, Lewis, Jay, and Prime.)

Pisidium ferrugineum, PRIME, Bost. Proc. IV, 1851, 162.

Remarkable for the elevation of its beaks, which stand forth on the upper portion of the shell in the shape of large tubercles, which are generally coated with some dark ferruginous substance. It differs from *P. abditum* in being smaller, more inflated, not so elongated, and more equilateral.

One of our most common species, found usually in company with *P. variabile* and *P. ventricosum*.

Fig. 77.



P. ferrugineum.

Fig. 78.



P. ferrugineum.

¹ Not to be confounded with *Cyclas pulchella*, HANLEY, or *Pisidium pulchellum*, JENYNS, a variety of *P. casertanum*, POLI.

² Not to be confounded with *Pisum ferrugineum*, DESHAYES, Biv. Brit. Mus. 1854, 281, which is *Sphærium ferrugineum*, KRAUSS, of Africa.

13. *Pisidium ventricosum*, PRIME.—Shell small, rounded-oval, globose, ventricose, somewhat oblique, slightly inequilateral, anterior side produced, posterior subtruncate; beaks small, protuberant, distant, situated towards the posterior side; surface smooth, yellow; hinge-margin curved; cardinal teeth separate; lateral teeth short.

Long. 0.11; Lat. 0.095; Diam. 0.085 inches.

Hab. North America, in the State of Massachusetts. Cabinets of the Boston Society, Smithsonian Institution, Lewis, Jay, Prime, and others.)

Pisidium ventricosum, PRIME, Bost. Proc. IV, 1851, 68.

Musculium ventricosum, ADAMS, Rec. Gen. II, 1858, 452.

Pisum ventricosum, ADAMS, loc. sub. cit. II, 1858, 660.

Fig. 79.



P. ventricosum.

This small, globose species is not likely to be confounded with any other but *P. rotundatum*, than which, however, it is more oblique, the margins are more abrupt, and the beaks more terminal and very much smaller. It is very nearly allied to *P. obtusale*, of Europe.

Fig. 80.



P. ventricosum.

14. *Pisidium rotundatum*, PRIME.—Shell small, rounded-oval, globose, ventricose, inflated, subequilateral; anterior and basal margins rounded, posterior margin somewhat abrupt; anterior side a little longer: beaks nearly central, very large, prominent, rounded; surface glossy, yellow, somewhat darker in the region of the beaks; hinge-margin curved; teeth small.

Long. 0.09; Lat. 0.07; Diam. 0.08 inches.

Hab. North America, in the region of Lake Superior. (Cabinets of Agassiz and Prime.)

Pisidium rotundatum, PRIME, Bost. Proc. IV, 1851, 164.

Musculium rotundatum, ADAMS, Rec. Gen. II, 1858, 452.

Pisum rotundatum, ADAMS, loc. sub. cit. II, 1858, 660.

Fig. 81.



P. rotundatum.

This species, allied only to *P. ventricosum*, is remarkable for the fulness of the beaks, which are not raised in proportion.

Fig. 82.

*P. rotundatum.*

15. *Pisidium occidentale*, NEWCOMB.—*P. testa rotundato-ovata, obliqua, inequilatera, hyalina vel fusco-cornea; natibus approximatis vix prominentibus; striæ minutissimæ.*

Long. 4; Lat. $3\frac{3}{4}$ mill.

Hab. North America, at San Francisco (Ocean House), California. (Cabinet of Newcomb.)

Pisidium occidentale, NEWCOMB, Proc. Calif. Acad. Nat. Sci. II, 1863, 94.

I have not seen this species, which Dr. Newcomb says is allied to *P. variabile*.

FOSSIL SPECIES.

16. *Pisidium contortum*, PRIME.—Shell elongated, subrhomboidal, inequilateral, somewhat compressed; anterior side produced, angular at end; posterior side short, subabrupt; hinge and basal margins nearly straight; beaks terminal, raised above the outline of the valves; striæ light; hinge comparatively strong; cardinal teeth distinct; lateral teeth elongated.

Fig. 83.

*P. contortum.*

Long. 0.13; Lat. 0.07; Diam. 0.05 inches.

Hab. North America, at Pittsfield, Massachusetts. Post Pleiocene formation. (Cabinets of Smithsonian Institution, and Prime.)

Pisidium contortum, PRIME, Ann. N. Y. Lyc. VI, 1853, 65, pl. i, f. 2.

This species, which occurs rarely, was discovered, by Dr. Shurtleff, in company with *P. ventricosum*.



APPENDIX.

7'. *Corbicula perplexa*, PRIME.—Testa transversa, ovato-subtrigona, inæquilaterali, compressa; latere antico brevior, rotundato; transversim dense et irregulariter striata; epidermide squalide virescente vestita.

Shell transverse, oval, subtrigonal, inequilateral, compressed; anterior side shorter, rounded; posterior side somewhat narrower at extremity; valves moderately solid, interior purplish-white with purple markings under the posterior lateral tooth and with distant and more or less distinct purple lines radiating from the apex of the shell towards the basal margin; striæ very close, irregular and indistinct; epidermis of a soiled green; beaks small, somewhat raised; hinge-margin broad with three unequal diverging cardinal teeth, the principal ones bifurcated; anterior cardinal tooth in the right valve nearly obsolete; palléal impression terminating in a small and short sinus.

Long. .48; Lat. .40 inch.

“ 12; “ 10 mill.

Hab. South America. (Cabinet of Prime.)

This species is very closely allied to *Corb. limosa*; it is however much smaller, more transverse, more produced on the posterior side; the hinge is less solid, and the cavity of the valves is deeper. I have failed to discover in any specimens of *Corb. perplexa* the radiating colored lines, which are frequently met with on the epidermis of *Corb. limosa*.

15'. *Pisidium ultramontanum*, PRIME.—Testa ovato-suborbiculari, subinæquilaterali, compressa, solidiuscula; umbonibus parvis, subdepressis, parum prominulis.

Shell comparatively solid, oval-suborbicular, subinequilateral, compressed; anterior side much produced between the extremity of the lateral tooth and the junction with the basal margin; posterior margin rounded; beaks small, not full, not much raised above the outline of the shell; valves shallow in the cavity; hinge strong; striæ delicate; epidermis light brownish horn color.

Fig. 84.



*Corbicula
perplexa.*

Fig. 85.



*Pisidium
ultramontanum.*

Long. .20; Lat. .16 inch.

" 5; " 4 mill.

Hab. North America, Canoe Creek in California. (Cabinets of the Smithsonian Institution and Prime.)

Remarkable for its spherical and flattened appearance; it is unlike any other species indigenous or foreign.

15." *Pisidium consanguineum*, PRIME.—Testa minuta, trans-

Fig. 86.



*Pisidium
consan-
guineum.*

versa, rotundato-ovata, inæquilaterali, compressiuscula; marginibus rotundatis; tenuissime striata; umbonibus tumidi-
usculis.

Shell small, transverse, rounded-oval, inequilateral, not much inflated; margins rounded; beaks somewhat apiculated; striæ very delicate; epidermis light horn color; teeth robust.

Long. .16; Lat. .12; Diam. .12 inch.

" 4; " 3; " 3 mill.

Hab. Retiro, Monte Verde and Catalina da Guarra, Cuba, West Indies (*fide* Wright). (Cabinet of Smithsonian Institution, Wright, Wheatley, and Prime.)

Very closely allied to *Pisid. abditum*, from which it is very difficult to distinguish it.

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